Ink Master

Reference Manual

User Information

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ABOUT QA-MASTER SOFTWARE INCLUDED WITH INK-MASTER®

X-Rite's QA-Master is also included with your Ink-Master® Formulation Software.

QA-Master Quality Assurance software package is setup and operates basically in the same manner as Ink-Master (i.e., creating customers, creating standards, etc.). Therefore, the Ink-Master Reference Manual can be referred to for information when required.

The QA-Master application does include extensive on-line help and an Interactive Tutorial if more detailed information is required on the application.

QA-Master is activated by double clicking on the QA-Master icon.

SECTION ONE

Getting Started

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Installing the Software.....1-2
Installing the Security Key.....1-3
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This section covers installing and starting your software application. It guides you through the installation process, then shows you what you'll see first and previews what you'll be doing first. Most of this information applies to the very first time you start up your software.

The next section, Instrument Set-up & Calibration, helps you connect your instrument and calibrate it for use with the software. Section Three is a User Interface Guide that briefly describes the windows, buttons, and menus that you use to run the software and Instruments. Once you become familiar with the user interface, you're ready to work with the software. Section Four—Setting Up Your Software describes how to set-up the software to work more conveniently for you. Section Five—Establishing Your Data describes the techniques and functions available to organize your data. Software functions available for ink formulation are explained in Section Six—Formulating. Section Seven provides information about the basic techniques for using the software, and Section Eight covers topics concerning managing your data. Section Nine describes all of the available methods for viewing your data. Lastly, Section Ten provides information about advanced software features.

INSTALLING THE SOFTWARE

Software is installed using X-Rite's Setup-Master program. This is a common program that allows you to install all of the available X-Rite applications from one consistent interface. Simply check the appropriate check boxes to select the applications you want to install.

NOTE: Some users of this software package have purchased "turn-key" systems with a pre-installed application. These users can use the following procedures in the event they must re-install the software from their back-up disks.

The Ink-Master software application installs onto your specified computer hard drive using a series of 3.5" diskettes. Installation instructions are provided for both Windows® 3.1 and Windows® 95. Successful installation creates a Program Manager group in the drive location you specified.

Windows 3.1 Installation

1. Start Windows.
2. Insert *Install Disk 1* into your 3.5" disk drive.
3. Select the **File** menu item of Program Manager.
4. Select the **Run** function from the **File** pull down menu.
5. Check the appropriate check boxes for the applications you want to install.
6. Select the correct source drive (**A:** or **B:**) from the **Source Drive** drop down list.
7. Click the **OK** button.
8. Follow the **Full Install** installation instructions on your computer screen.

Windows 95 Installation

1. Insert *Install Disk 1* into your computer's 3.5" diskette drive.
2. Select your **Start** button.
3. Select the **Control Panel** folder under the Setting Start Menu item.
4. Double-click the **Add/Remove Programs** icon in the **Control Panel** directory. The **Add/Remove Programs Properties** dialog box appears.
5. Click the **Install/Uninstall** tab to activate the Install function, then click the **Install…** button.

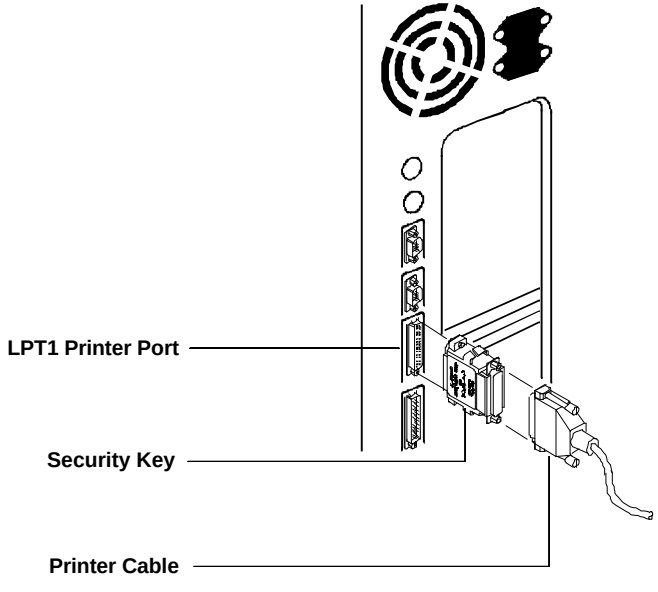
6. Follow the Install Wizard prompts to start the software **Setup** program, then check the appropriate check boxes for the applications you want to install.
7. Select the correct source drive (**A:** or **B:**) from the **Source Drive** drop down list.
8. Click the **OK** button.
9. Follow the **Full** installation instructions.

INSTALLING THE SECURITY KEY

A security key is provided with your system and must be installed in order for the software to operate.

To install the security key:

1. Insert the security key into the parallel printer port on the back of your computer and secure it with two screws.
2. A parallel printer can be plugged directly on the Security Key. **NOTE:** If using a printer, the printer must be "on line" for the security key to function properly.



STARTING THE SOFTWARE

Before starting the software, you should take a moment to check your display driver's color settings. For optimal representation of on-screen color simulations, your display driver should be set up for 256 resolution to display 64K (65,536) colors.

To check your display driver settings:

1. Open the Windows 95 **Control Panel** folder.
2. Double-click the **Display** program icon in the **Control Panel** directory. The **Display Properties** dialog box appears.
3. At the top of the **Display Properties** box, click the **Settings** tab. The **Settings** layer of controls appears.
4. Check the **Color Palette** menu. It should be set to High Color (16 bit) or True Color (24 bit). If neither of these settings is available in the pop-up menu, your display driver does not support these resolution settings.

Once the software is installed on your computer, you can start it by double-clicking the Program Icon located in the software's directory.

Software Startup Icon

See Section Two—Instrument Set-up and Calibration for instructions on how to connect your instrument.

WHAT YOU'LL SEE FIRST

The first time you open the software, the software user interface Main Window appears. This Main Window consists of the Menu Bar, the Control Window, and the Desktop Area. Refer to Section Three—User Interface for more information.

IMPORTANT NOTE: The software is designed with the familiarity of standard Windows® environment. Basic functions and terminology of the software and the User's Manual follow these standards. For more information about the basics of Windows, see the Windows tutorial in the Windows help.

The Menu Bar

The Menu Bar holds the pull down menus items. Each pull down menu item contains functions related to it. For example, the **Edit** pull down

menu contains functions used for editing such as the **Copy…** function and the **Paste...** function.

The Control Window

The Control Window provides you with the current information, a way to access different information, and ways to create, edit, or delete information.

The Desktop Area

The Desktop Area is where you can view your data in various ways, as well as viewing any associated information. Below is a list of available "views."

- Tolerance (L*a*b* or Trend)
- FMC2
- Spectral
- Status Density…
- Trend…
- L*a*b* Data
- Spectral Data
- Status Density Data…
- Formula
- Notes and Tags
- Visual Color
- Verbal Color
- Indices (General or Ink)

TUTORIAL

You should go through the QA-Master Interactive Tutorial that is provided with this software. The tutorial can be accessed by clicking on the **Help** menu, then clicking on **Tutorial**.

SECTION TWO

Instrument Set-up & Calibration

Section Contents

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Proper Measuring Techniques.....2-4
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Section Two covers the proper way to connect the two types of instruments that are used with the software. Instructions for connecting each of the instruments are given in the format of “Six Easy Steps.”

This section also gives a brief series of proper measuring techniques to follow when using any type of instrument to measure your substrate, standard, or trial ink, as well as providing instrument calibration instructions. If you have any further questions about your instrument that are not included in this section, consult your instrument manual.

CONNECTING YOUR INSTRUMENT

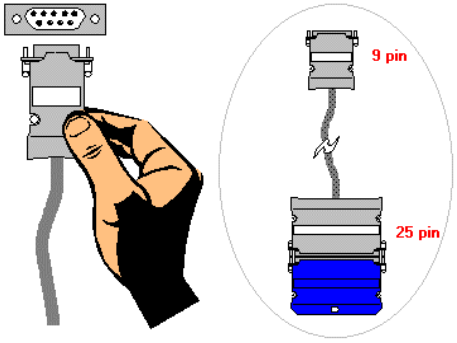
The following sub-sections give instructions for connecting each type of instrument: 0°/45° Series and Sphere Series.

Important Notice: Always turn your computer *off* before connecting any instrument.

0°/45° Series: Six Easy Steps

To install your 0°/45° Series instrument for use with Ink-Master, complete the following steps:

1. Insert the 9 pin Serial Cable into your available communications (COM) port on the back of your computer. Be sure to note the COM port number. The 25 pin to 9 pin adapter provided (part no. 418-91-01 of the MA58-75 Interface Cable Kit) is needed when connecting to a 9 pin COM port.

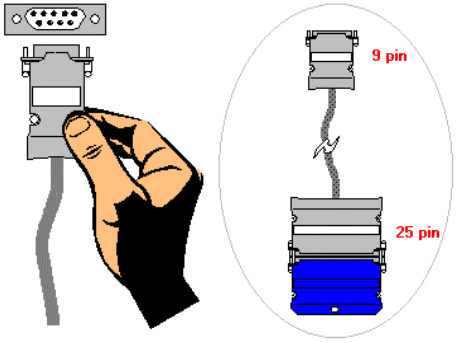


2. Plug the Power Supply into your wall outlet, and plug its adapter into the 25 pin Serial Connector.
3. Connect one end of the flat cable to your 0°/45° instrument and the other end to the Connector assembly.
4. Turn your computer system on and start the software.
5. Select the proper COM port (COM1, COM2) in the **Instrument Port** item of the **Options** menu. A check mark appears just to the left of your selection.
6. Select the **0°/45°** setting in the **File** menu. A check mark appears just to the left of your selection.

Sphere Series: Six Easy Steps

To install your Sphere Series instrument for use with Ink-Master, complete the following steps:

1. Insert the 9 pin Serial Cable into your available communications (COM) port on the back of your computer. Be sure to note the COM port number. The 25 pin to 9 pin adapter provided (part no. 418-91-01 of the MA58-75 Interface Cable Kit) is needed when connecting to a 9 pin COM port.



2. Plug the Power Supply into your wall outlet, and plug its adapter into the 25 pin Serial Connector.
3. Connect one end of the flat cable to your Sphere instrument and the other end to the Connector assembly.
4. Turn your computer system on and start the software.
5. Select the proper COM port (COM1, COM2) in the **Instrument Port** item of the **Options** menu. A check mark appears just to the left of your selection.
6. Select the **Spherical** setting in the **File** menu. A check mark appears just to the left of your selection.

PROPER MEASURING TECHNIQUES

When using Ink-Master, proper measuring techniques are essential to generate accurate ink formulations. An ink formula can only be as good as the sample measurements that are taken. The following is a list of proper measuring techniques.

- **Select a Good Measurement Area** - Find a blemish-free area that represents the color of the ink sample.
- **Instrument Alignment** - While taking a measurement, keep the instrument flat against the surface you are measuring.
- **Keep the Instrument Still** - While the instrument is performing a measurement, keep the instrument *and* the sample you are measuring as still as possible.
- **Consult Your Instrument Manual** - These basic instructions should help you take precise measurements. For detailed instructions on the use and maintenance of your instrument, be sure to read your instrument manual.
- **Consistent Backing -** When measuring substrates, standards, or trials, ensure that the color of the surface behind the sample is consistent with the substrate being measured. You can do this by placing layers of the same substrate under the sample while measuring. This is especially important when measuring thin substrates that allow light to pass through. Any dark or bright colors behind the substrate can affect the way your instrument measures the sample.

TIP: When measuring color on clear film, there is an error introduced by the reflection off the backside of the film. This error can be reduced by wetting (with distilled water) the area between the film and the backing. This wetting allows most of the reflection to come off of the backing rather than the backside of the film. Don't wet the surface if the film and backing are not waterproof.

INSTRUMENT CALIBRATION

Your instrument should be calibrated often to ensure measurement accuracy. Calibrating your instrument is done in one of two manners: you can either choose to calibrate the instrument or wait until the software notifies you of the need for calibration. Refer to your instrument's operation manual for the appropriate calibration schedule.

Choose to Calibrate

1. Select **Calibrate…** in the **Instrument** pull down menu. The Calibration dialog appears.
2. If you need to change any of the calibration (Reflection Standard) values, highlight the value and type in the new value.
3. Click the **Calibrate** button. Wait for the Calibration Instructions to appear.
4. Position the target window of the instrument over the white spot on the standard and take your white calibration readings. Be sure to let the whole shoe of the instrument rest on the standard as you take your reading. (The entire standard should be covered.)
5. *For spherical instruments only*, position the instrument's target window over the opening in the black trap and take a measurement.
6. When the calibration is finished, a "Calibration Complete" message appears. Click on **OK**.

Prompted to Calibrate

1. If you try to take a measurement and calibration is needed, an "Instrument Needs Calibration" error message appears.
2. Click the **OK** button. Wait for the Calibration Instructions to appear.
3. Position the target window of the instrument over the white spot on the standard and take your white calibration readings. Be sure to let the whole shoe of the instrument rest on the standard as you take your reading. (The entire standard should be covered.)
4. *For spherical instruments only*, position the instrument's target window over the opening in the black trap and take a measurement.
5. When the calibration is finished, a "Calibration Complete" message appears. Click on **OK**.

NOTE: *For 0°/45° instruments only!* When a black calibration is requested, take a reading in a dark room for your zero reflectance reading. (In most cases, it is possible to take a zero reflectance reading under a desk with no direct light.)

SECTION THREE

User Interface

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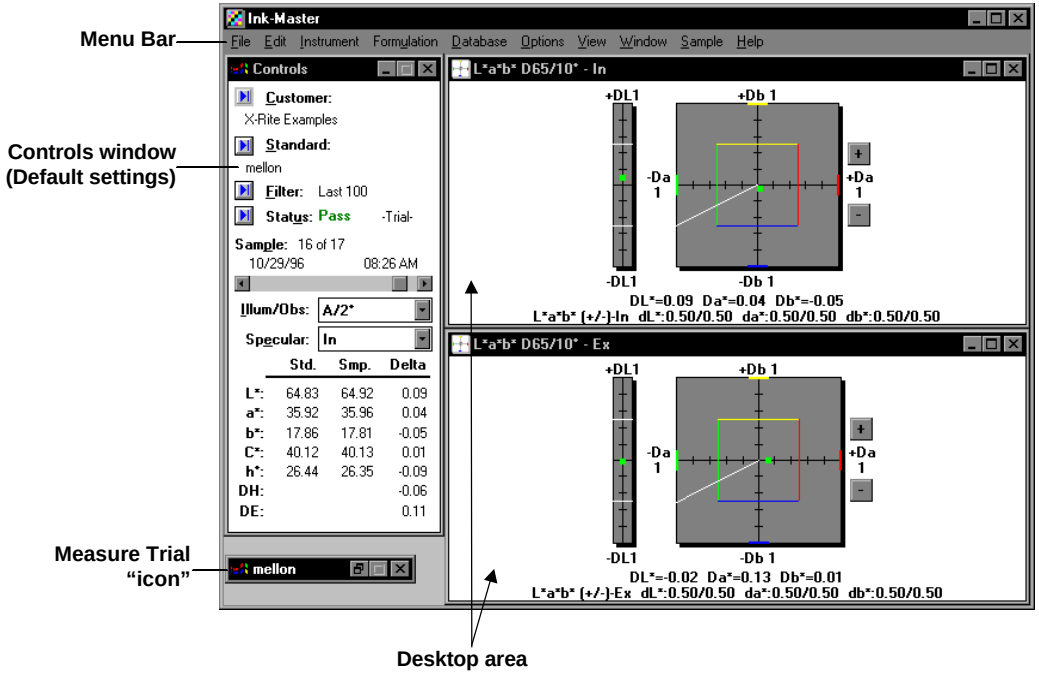
Section Three describes the user interface of Ink-Master. It outlines the various contents of the Ink-Master main screen as well as providing information about using the mouse and the keyboard. Lastly, this section explains how to access the Ink-Master Help text.

Even though Section Three gives descriptions of the Controls window contents, it does not provide explanations for the use of these functions. The remaining sections will help to provide explanation for all functions—they will walk you through customizing the software and through the processes of establishing and measuring data, formulating inks, managing data, and viewing data.

NOTE: The screen captures in this manual show Ink-Master operating with Windows® 95 (the recommended environment). If Ink-Master is used with an older version of Windows®, some differences may exist.

MAIN SCREEN

Below is an example of the Ink-Master main screen. It contains a menu bar, a Controls window, and a desktop area.

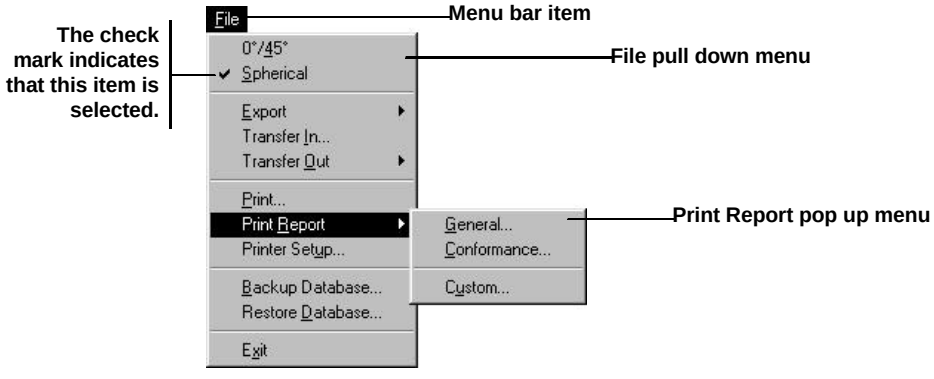


MENU BAR

The items listed in the menu bar are names of pull down menus. When you click on a menu item, a pull down menu appears with a list of the available items. There are three types of items found in a pull down menu.

- Grayed Text - Commands that are grayed out are inactive or disabled. However, they may become active after another function has been completed.
- **Ellipsis (. . .)** - Clicking on a command with ellipsis opens a dialog box. A dialog box will ask for further information and you will have to click on **OK** to complete the command.
- **Arrow ( )** - Clicking on a command with an arrow opens a pop up menu with available sub-menu items that you can select.

Below is the **File** pull down menu.



Simply click on an item to select it. For more information on the Windows conventions for menu items, refer to the Windows Help file or your Windows documentation.

CONTROLS WINDOW

The Controls window can be customized to meet your requirements. The following list describes the items in the Controls window.

Customer - displays the current customer. The **Customer** arrow button opens the Customer Maintenance dialog which allows you to create, edit, or delete customer information.

Standard - displays the current standard. The **Standard** arrow button opens the Find Standard dialog which allows you to select a different standard.

Standard Description - displays the description for the current standard. This drop down menu allows you to choose alternate standards (if any exist). Refer to Section Ten—Advanced Software Features for more information about alternate standards.

Filter - defines the set of samples displayed. The **Filter** arrow button opens the Filters dialog which allows you to choose a different filter set to display.

Sample and Scroll Bar - indicates the current sample displayed out of the sample set (e.g., 2 of 4). The scroll bar allows you to select which sample of the set to display. (Samples can be either ink matches or ink trials.)

Status - displays the status, PASS (in green text) or FAIL (in red text), of the sample according to the standard's set tolerances. The **Status** arrow button displays the Status dialog which contains the tolerance parameters and the sample status. (The **Edit Tolerance Visually…** button opens the Visual Tolerance Editor dialog. Refer to Section Ten—Advanced Software Features.)

Accept/Reject/Undetermined - These radio buttons indicate the acceptability of the sample. You can either manually select the acceptability of the sample, or you can let the software assign the acceptability according to the sample's pass or fail status.

Lot ID - displays the Lot Identification for the current standard and sample. This field also allows you to create a new Lot ID or to edit a Lot ID. The **Lot ID** arrow button displays the Find Lot ID dialog which allows you to search for a specific Lot ID.

Sample Note - displays a single line "note" regarding the current sample (if one exists). This field also allows you to create a new note or edit the current note.

Sample Tag - displays a tag for the current sample. The **Sample Tags** arrow button displays the Select Tags dialog which allows you to select tags.

Illuminant/Observer - displays the illuminant/observer combination for the current standard and sample data. The drop down menu also allows you to select a different illuminant/observer. The following is a list of available illuminants. (The 2° and 10° designations represent the viewing angle—the observer.)

- **A/2°** and **A/10°** - incandescent light; color temperature: 2856K
- **C/2°** and **C/10°** - daylight (simulated overcast sky): 6774K
- **D50/2°** and **D50/10°** - natural daylight; color temperature: 5000K
- **D65/2°** and **D65/10°** - natural daylight; color temperature: 6500K
- **F2/2°** and **F2/10°** - cool white fluorescent illuminant
- **F7/2°** and **F7/10°** - daylight white fluorescent illuminant
- **F11/2°** and **F11/10°** - three narrow band white fluorescent illuminant
- **F12/2°** and **F12/10°** - the Ultralume 3000 fluorescent illuminant

Specular - displays whether or not the current standard and sample data is specular included or specular excluded. **NOTE:** This applies only to

data gathered by a sphere instrument. The drop down menu allows you to choose either specular included (**In**) or specular excluded (**Ex**).

L*a*b* Data - displays the L*, a*, b*, C*, h°, DH, DE, and delta difference values for the standard and sample.

DESKTOP AREA

When Ink-Master is first started, the L*a*b* views are displayed in the Desktop. The Desktop area can vary depending on what views are selected in the **View** menu, and what display options are set in **Options** menu. The **View** menu allows you to select L*a*b*, FMC2, Spectral, Status Density, Trend, L*a*b* Data, Spectral Data, Status Density Data, Visual Color, Verbal Color, Formula, Indices, and Notes & Tags as well as other views. Default display options can be set using the **Display** functions in the **Options** menu. Refer to Section Four—Setting Up Your Software for more information.

USING YOUR MOUSE

The mouse is used to move the cursor on the screen. If you are unfamiliar with mouse operation, refer to the Windows Tutorial.

Using the mouse involves several techniques:

- **Pointing** - Moves the mouse so the tip of the cursor is over an object on the screen.
- **Clicking** - Means to quickly press and release the (right) mouse button. This is a common way of selecting objects in a window.
- **Dragging** - To press and hold the (right) mouse button while you move the mouse. Use dragging when you move or change the size of a window.
- **Double Clicking -** To quickly press and release the (right) mouse button twice. Use double clicking to open file names and restore minimized icons.

The mouse cursor changes depending on what you are doing or where it is located on the screen. Below is a list of the various cursors you may see.

Selection Tool Cursor - allows you to select commands and pull down menus.

Crosshair Cursor - appears when you are over a graph in the desktop area. It allows you to easily target spots on the reflectance graphs. (The **Reflectance Track** View Default option must be active. Refer to Section Four—Setting Up Your Software.)

Text Cursor - appears when the cursor is in a field which allows you to type text.

Wait Cursor - appears when the program performs a task (ex., saving files, taking measurements).

Resize Cursor - appears when you are over the top or bottom border of the window. It allows you to resize the window vertically.

Resize Cursor - appears when you are over the left or right border of the window. It allows you to resize the window horizontally.

Resize Cursor - appears when you are over one of the corner borders of the window. It allows you to resize the window proportionally.

Help Cursor - appears when you select **Context** in the **Help** pull down menu.

Help Glossary Cursor - appears when you are over a glossary word in the Help file. At that time, if you click on the glossary word its definition is displayed.

USING THE KEYBOARD

Many of the functions you perform with the mouse can also be done with the keyboard. Most of the keyboard functions are explained in the Window's Program Manager Help file. Below are some basic keyboard procedures.

Active Window

When a window is active, a control function can be selected by pressing the **Alt** key and then the designated letter (marked by an underline) in the control name. For example, if the Control window is active you can press **Alt+t** to view the status of the selected measurement. This means you would *hold down* the first key (**Alt**) and then press the second key (**t**), then release both keys.

Menu Item

You can select any of the pull down menus on the main screen by pressing **Alt** and then the designated letter (marked by an underline) in the menu name. For example, to select the **File** menu you would press **Alt , F.** This means you would *momentarily* press the first key (**Alt**) and then press the second key (**F**).

After a pull down menu is open you can select the operation you want to perform by pressing the underlined letter in that function. To select **Exit** you would press **x**.

GETTING HELP

You can reach the Ink-Master Help by two methods, the Index method and the Context method. The Index method provides access to Help with the use of an index. The Context method allows you to access Help for an item or function by directly clicking on it in the menu.

When you are in the help file, a Glossary Cursor appears when you are over a glossary word. At that time, you can click on the word to get its definition.

Steps:

To access Help text, complete the following steps.

1. Click on the **Help** Menu. This opens the **Help** pull down menu.
2. To access help by the Index method, follow these steps.
   - Click on **Index**. This opens the Help Index.
   - Click on the topic for which you want help.
3. To access help by the Context method, follow these steps.
   - Click on **Context**. The help cursor appears.
   - Click on *any* menu bar item for which you want help.

SECTION FOUR

Setting Up Your Software

Section Contents

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Formulation Options 4-3
Units of Measure Options.....4-6
Display Options.....4-7
Instrument Port 4-10
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Auto Inventory 4-11

Section Four discusses the functions that allow you to customize the way your software runs. All of these functions are found in the Options menu: Administrative, Database, Formulation, Units of Measure, Display, Instrument Port, Instrument Mode, and Auto Inventory.

Ideally, you should select your software set-up options before doing anything in Ink-Master. Changing two Units of Measure options, **Monetary** units and **Film Thickness** units, after data is established, causes the data dependent upon those units to become incorrect. See the Units of Measure sub-section for more information.

ADMINISTRATIVE OPTIONS

The **Administrative…** function displays the Access Levels dialog which allows you to determine access privileges to certain software functions. A password is required to reach the Access Levels dialog. A generic password is originally assigned to this function, **PASSWORD**. When you first open the Administrative function this generic password must be used.

Steps:
To open the Access Level dialog, complete the following steps.

1. Select the **Administrative…** function from the **Options** menu. The Administrative Access dialog is displayed.
2. Enter the password in the **Password** field.
3. Click the **OK** button. This opens the Access Levels dialog.

Once in the Access Levels dialog you may assign your own password.

Steps:
To change the password for the **Administrative…** function, complete the following steps.

1. Click the **Change Password…** button. This opens the Change Password dialog.
2. Enter the old password in the **Old Password** field.
3. Enter the new password in the **New Password** field.
4. Enter the new password again in the **Verify New Password** field.
5. Click the **OK** button. Your new password is assigned.

Access privileges are assigned by checking the check box next to the function. Below is a list of the functions affected by access levels.

- **Edit Calibration Sets/Inks**
- **Edit Standards**
- **Sample/Set Deletion**
- **Edit Customer**
- **Edit Supplier**
- **Edit Formulation Options**
- **Transfer In/Restore Database**
- **Instrument Calibration**

Steps:
To assign access privileges to a function(s), complete the following steps.

1. Select the check box to the left of the function to which you want access. A “checked” check box has a check mark in it.
2. Repeat for all the functions to which you want access.
3. Click the **OK** button.

DATABASE OPTIONS

The **Database…** function displays the Database Options dialog. This dialog displays the paths for your 0°/45° database and your Spherical database. *These paths are informational only and should not be changed.* It also allows you to determine Search Options: the maximum Delta E value of samples for a typical standard, and the Delta E value used to automatically select the closest match during a standard search.

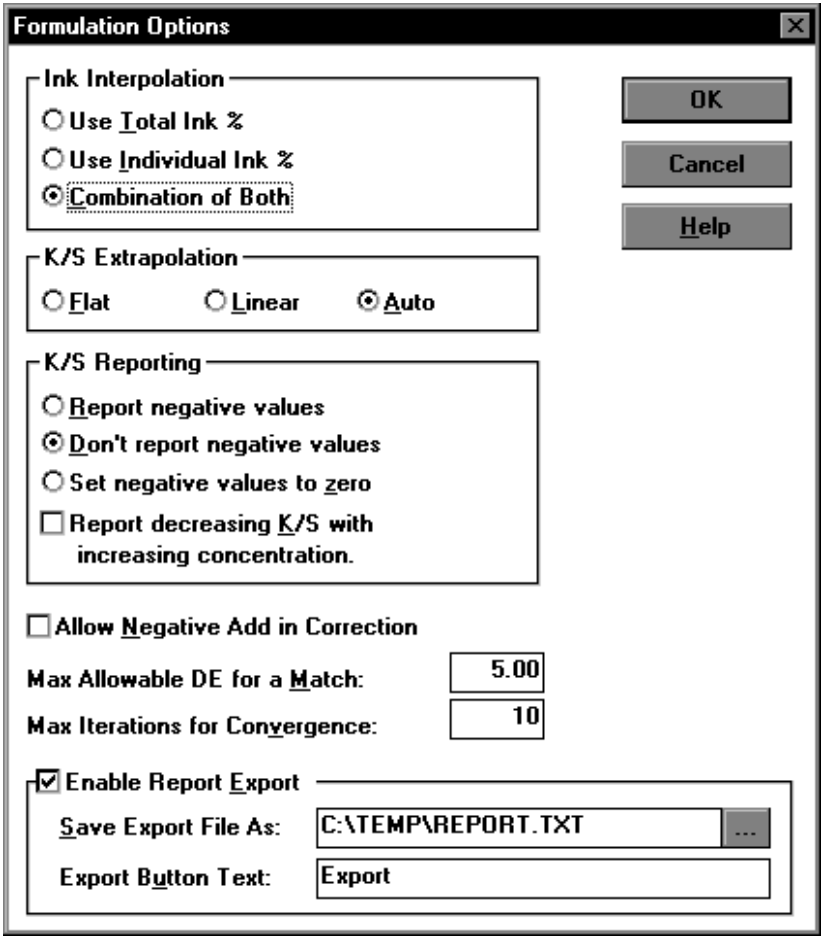
NOTE: By default, this option is disabled by the Administrative Access Security.

Steps:
To define the Search Options, complete the following steps.

1. Enter the maximum Delta E value of samples for a typical standard in the **Find new standard if sample DE >** field.
2. Enter the Delta E value used to automatically select the closest match during a standard search in the **Auto accept standard search result if DE <** field.
3. Click the **OK** button.

FORMULATION OPTIONS

The **Formulation…** function allows you to specialize your formulation process. If you do not have a specialized process, these options are best left at their original settings. Contact your X-Rite Application Support Specialist if required.



This function displays the Formulation Options dialog which contains the following options:

- **Ink Interpolation** radio buttons:
  - **Use Total Ink % -** The software uses the combined percentages of the inks in a formula to calculate data.
  - **Use Individual Ink % -** The software uses the individual ink percentage from a formula to calculate data.
  - **Combination of Both -** The software uses both of the above options, Use Total Ink % and Use Individual Ink %.
- **K/S Extrapolation** radio buttons:

  - **Flat -** All concentrations above the highest calibration sample have equivalent K/S values.
  - **Linear -** The K/S data is generated by drawing a line from zero through the last calibration point.
  - **Auto -** An automated method is used to generate the data beyond the last calibration point.
- **K/S Reporting** radio buttons:
  - **Report negative values -** All negative K/S, K, and S values generated during recalculation of inks are reported.
  - **Don't report negative values -** negative K/S, K, and S values are not reported.
  - **Set negative values to zero -** negative K/S, K, and S values are automatically reset to zero.
- **Allow Negative Add in Correction -** When checked, this check box allows negative values to display for ink correction adds (if the substrate add is above zero).
- **Max Allowable DE for a Match -** This allows you to assign the Delta E that must be met for a formula combination to be displayed during formulation.
- **Max Iterations for Convergence -** This allows you to assign the maximum number of iterations the software performs when attempting to formulate to zero Delta E. A smaller number generates less accurate formulas, however, formulation speed increases.
- **Enable Report Export -** When checked, this check box allows you to export a formula report. The following information also must be completed.
  - **Save Export File As -** This is where you enter the filename for the export file. The **…** button allows you to assign a path and name in a standard Windows Save As dialog.
  - **Export Button Text -** This is where you enter the text you want to be displayed on the button that exports the report.

Steps:

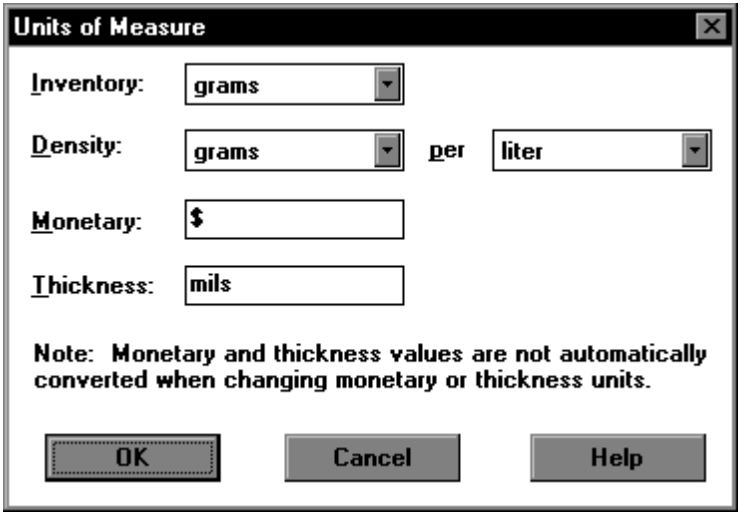
To define the Formulation Options, complete the following steps.

1. Select the desired **Ink Interpolation** radio button.
2. Select the desired **K/S Extrapolation** radio button.
3. Select the desired **K/S Reporting** radio button.
4. If desired, check the **Allow Negative Add in Correction** check box.

5. Enter the maximum Delta E value to meet for a match in the **Max Allowable DE for a Match** field.
6. Enter the maximum formulation iterations in the **Max Iterations for Convergence** field.
7. If desired, check the **Enable Report Export** check box, and enter the export filename in the **Save Export File As** field and export button text in the **Export Button Text** field.
8. Click the **OK** button to save your formulation options.

UNITS OF MEASURE OPTIONS

The **Units of Measure…** function displays the Units of Measure dialog. This dialog allows you to assign *default* inventory units, density units, monetary units, and film thickness units. These units are then used throughout the software. Since Ink-Master allows you to select different units within various dialogs, you can perform "on-the-spot" conversions.



If you change the inventory units and density units after data is established in your database, all of the data (values) dependent upon these units are automatically converted to reflect the *new* units. Unfortunately, this condition does not apply to the monetary units or film thickness units since Ink-Master has no way of converting these units if they are changed.

CAUTION: If you change the monetary default units or film thickness default units *after* you have established data in your database, all of the data (e.g., Cost) dependent upon these units becomes *incorrect*. The units

change, but the value does not. The data or values dependent upon these units then need to be re-entered and/or recalculated.

Steps:
To define your units of measure, complete the following steps.

1. Select the **Units of Measure…** function from the **Options** menu. This opens the Units of Measure dialog.
2. Select the desired inventory unit of measurement from the **Inventory** drop down list.
3. Select the desired density unit of measurement from the **Density** drop down list and the **per** drop down list.
4. Enter the desired monetary unit of measurement in the **Monetary** field.
5. Enter the desired film thickness unit of measurement in the **Thickness** field.
6. Click the **OK** button to set your units of measurement.

DISPLAY OPTIONS

The **Display** pop up menu contains functions that allow you to control your software display. Each Display function is described below.

Auto Arrange

When the **Auto Arrange** function is checked, the software automatically arranges all open windows to fill the screen, even when you move or resize windows. When un-checked, any window arrangement or sizing you do is unaffected.

Steps:
To activate the **Auto Arrange** function, simply select it from the **Display** pop up menu.

Auto L*a*b*

When the **Auto L*a*b*** function is checked, the software automatically displays *all* preset tolerances for the current standard in L*a*b* graphs.

Steps:
To activate the **Auto L*a*b*** function, simply select it from the **Display** pop up menu.

Auto Trend

When the **Auto Trend** function is checked, the software automatically displays *all* preset tolerances for the current standard in trend graphs.

Steps:

To activate the **Auto Trend** function, simply select it from the **Display** pop up menu.

User Defined Controls

When the **User Defined Controls…** function is selected, the Controls Window Configuration dialog is displayed. This dialog allows you to select which control items you want to display in the Controls window. The control items can then be arranged in any order, or the items can be arranged automatically by checking the **Smart Layout** check box. The **Default** button returns the items to the default selection and order: **Customer and Standard**, **Set Filter**, **Pass/Fail Status**, **Sample Selector**, and **L*a*b* Data**.

The following is a list of the control items available:

- **Customer and Standard**
- **Standard Description**
- **Set Filter**
- **Sample Selector**
- **Pass/Fail Status**
- **Accept/Reject Status**
- **Lot ID**
- **Sample Notes/Tags**
- **L*a*b* Data**

NOTE: All nine Controls window items can be selected for display; however, the last items extend off the screen when in 800 x 600 display mode. 1024 x 768 display mode must be used if all items are to be displayed.

Steps:

To customize the Controls window, complete the following steps.

1. Select the **User Defined Controls…** function from the **Display** pop up menu. This opens the Controls Window Configuration dialog.

2. Highlight a Control window item that you want to display in the **Available** list box, and click the **>>** button to move the item to the **Selected** list box. (Do the reverse if you want to remove an item from the **Selected** list box; highlight the item in the **Selected** list box and click the **<<** button.) Repeat this step for each Controls window item you want to display in the Controls window.
3. Check the **Smart Layout** button if you want your items automatically arranged, *or* click the **Up** or **Down** button to move a highlighted item up or down in the **Selected** list (repeat until items are arranged in desired order).
4. Click the **OK** button.

View Defaults

When the **View Defaults…** function is selected, the View Defaults dialog is displayed. This dialog allows you to customize certain parameters in the L*a*b*, Reflectance, or Trend windows. The default settings affect all of the L*a*b*, Reflectance, or Trend windows that are currently displayed. Any view option that is selected remains selected even after exiting the software.

The following is a list of the available defaults:

- **L*a*b* Graph Scatter** - All samples (trials and matches) in the sample set are displayed in the L*a*b* graph. The current sample is highlighted in green (pass) or red (fail).
- **L*a*b* Graph Auto Scale** - The L*a*b* graph is automatically scaled to best display the current sample's measurement.
- **Reflectance Grid** - A grid is displayed in the Reflectance graph.
- **Reflectance Mark** - When checked, clicking on a wavelength (must be a 10 nm interval) places a vertical line at the selected wavelength and displays the Delta E for that wavelength. The standard is white and the sample is either green (pass) or red (fail).
- **Reflectance Track** - This is used to view the exact location of every point on the spectral curve. Position the cross hair cursor with the mouse to any point along the curve. The reflectance value and wavelength will be displayed in the upper left-hand portion of the Reflectance window.
- **Reflectance Range** - This shows the measurement variation of the sample set reflectance curves. The upper and lower range curves are gray.

- **Trend Control Limits** - Upper and lower control limits (tolerances) are displayed in the Trend graph. These are displayed only when the tolerance exists for the selected method and illuminant/observer.
- **Trend Grid** - A grid is displayed in the Trend graphs.
- **Trend Viewport** - This value sets the number of samples that are displayed at one time.

Steps:
To set your view defaults, complete the following steps.

1. Select the **View Defaults…** function from the **Display** pop up menu. This opens the View Defaults dialog.
2. Check all the defaults that you want active.
3. Enter the number of samples you want displayed in the **Trend Viewport** field.
4. Click the **OK** button to set your view defaults.

INSTRUMENT PORT

The **Instrument Port** pop up menu allows you to select the serial Com port (1 or 2) that your instrument uses.

Steps:
To select your instrument port, simply select either **COM1** or **COM2** from the **Instrument Port** pop up menu. (A check mark indicates which port is selected.)

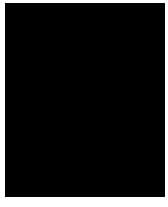
INSTRUMENT MODE

The **Instrument Mode** pop up menu allows you to determine the mode of your instrument. There are three instrument modes:

- **Normal** - This mode allows normal X-Rite instrument measurement procedures.
- **Closed Shoe Read** - This mode enables you to take measurements with the instrument's shoe opened or closed. Once activated, measurements are initiated by clicking a **Close Shoe Read** button.
- **Macbeth** - This mode is used for Macbeth® sphere instruments. This mode is not available when **0°/45°** is selected in the **File** pull down menu.

Steps:

To select your instrument mode, simply select **Normal**, **Closed Shoe Read**, or **Macbeth** from the **Instrument Mode** pop up menu. (A check mark indicates which mode is selected.)



AUTO INVENTORY

The **Auto Inventory** function automatically displays the Edit Inventory Amount dialog when a Batch Add Formula report is printed. This dialog allows you to view and edit original ink inventories for the generated formula before the report is actually sent to the printer.

The Edit Inventory Amount dialog lists the ink names and corresponding inventory amounts in the units selected from the units drop down list. The **OK** button saves all inventory changes.

Steps:

To display the Edit Inventory Amount dialog *automatically*, simply check the **Auto Inventory** item in the **Options** pull down menu. (A check mark indicates that the item is selected.)

SECTION FIVE

Establishing Your Database

Section Contents

Entering Customers and Suppliers 5-2
Setting Up a Calibration Set.....5-5
Entering Calibration Inks.....5-10
Creating a Secondary Calibration Set 5-17
Creating a Substrate Library 5-20

Section Five discusses how to establish data in your database so that you can organize your data and perform formulation matches.

You first need to determine who your formulations are for and who the raw materials are from—enter your customers and suppliers. Then you can set-up calibration sets and enter the raw material information—calibration inks. If desired, Ink-Master allows you to create a secondary calibration set from an established calibration set. You may even enter all your known substrates to create a substrate library.

ENTERING CUSTOMERS AND SUPPLIERS

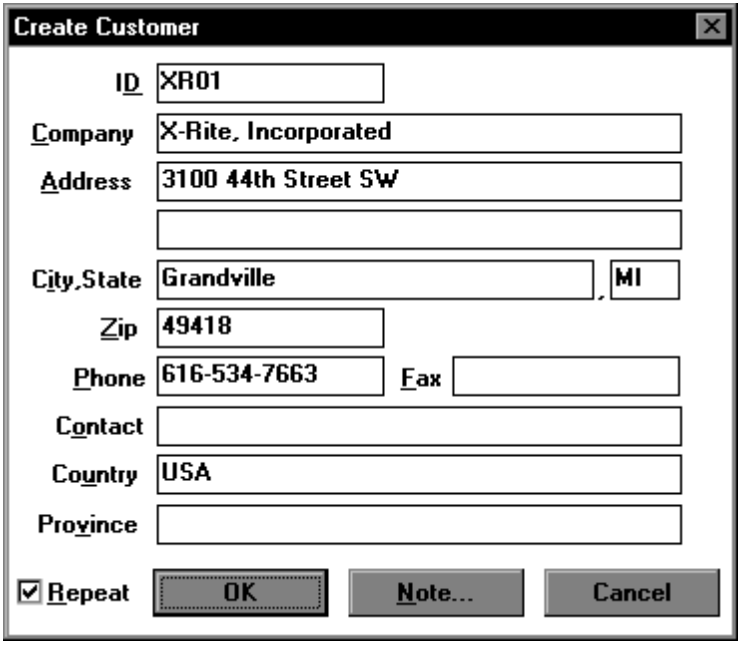
Customers are those who you create formula matches for, and suppliers are those who provide you with the raw materials needed to create an ink match. Ink-Master provides customer maintenance and supplier maintenance functions that allow you to organize this data. The following sub-sections discuss these maintenance functions.

Create/Edit a Customer

Customer information provides a method of organizing the standards and formulation tolerances from a customer. All samples based on a standard are also organized by customer. Therefore, not only is a standard linked to the customer who provided it, the samples formulated from that standard are *also* linked to the customer.

Customer "maintenance"—creating, editing, and deleting—allows you to establish customers, change customer information, and remove customers from your database.

CAUTION: Deleting a customer from the database also deletes all the associated standards and samples that are linked to it.



Steps:
To create a new customer, complete the following steps.

1. Select the **Edit Customers…** function from the **Database** menu. This opens the Customer Maintenance dialog.
2. Click the **Create…** button. This opens the Create Customer dialog.
3. Enter the customer's ID in the **ID** field.
4. Enter the company name in the **Company** field.
5. If desired, enter information about the customer in the remaining fields.
6. If you want to create a note for the customer, click the **Note…** button to enter any notes in the Note Editor. Refer to Section Seven—Basic Techniques.
7. If you want to create another new customer without closing the Create Customer dialog, check the **Repeat** check box.
8. Click the **OK** button.

Steps:
To edit an existing customer, complete the following steps.

1. Select the **Edit Customers…** function from the **Database** menu. This opens the Customer Maintenance dialog.
2. Click the **Edit…** button. This opens the Edit Customer dialog. You can not change the supplier's ID.
3. Edit any of the information about the supplier in the remaining fields.
4. If you want to edit the note, click the **Note…** button to edit the notes in the Note Editor. Refer to Section Seven—Basic Techniques.
5. Click the **OK** button.

Steps:
To delete an existing customer, complete the following steps.

CAUTION: Deleting a customer from the database also deletes all the associated standards and samples that are linked to it.

---

1. Select the **Edit Customers…** function from the **Database** menu. This opens the Customer Maintenance dialog.

2. Click the **Delete…** button. This opens the Delete Customer dialog.
3. Click the **OK** button. A warning dialog appears.
4. Click the **Yes** button to delete the customer and all the information linked to it. Click the **No** button if you do not want to delete the customer.

Create/Edit a Supplier

Supplier information provides a method of organizing inks under the supplying vendor. Therefore, all inks are linked to their supplier. Supplier "maintenance"—creating, editing, and deleting—allows you to establish suppliers, change supplier information, and remove suppliers from your database.

CAUTION: Deleting a supplier from the database also deletes all the ink information that is linked to it.

Steps:

To create a new supplier, complete the following steps.

1. Select the **Edit Suppliers…** function from the **Database** menu. This opens the Supplier Maintenance dialog.
2. Click the **Create…** button. This opens the Add Supplier dialog.
3. Enter the supplier's ID in the **ID** field.
4. Enter the company name in the **Company** field.
5. If desired, enter information about the supplier in the remaining fields.
6. If you want to enter a note, click the **Note…** button to enter any notes in the Note Editor. Refer to Section Seven—Basic Techniques.
7. If you want to create another new supplier without closing the Add Supplier dialog, check the **Repeat** check box.
8. Click the **OK** button.

Steps:

To edit an existing supplier, complete the following steps.

1. Select the **Edit Suppliers…** function from the **Database** menu. This opens the Supplier Maintenance dialog.
2. Click the **Edit…** button. This opens the Change Supplier dialog. You can not change the supplier's ID.

3. Edit any of the information about the supplier in the remaining fields.
4. If you want to edit the note, click the **Note…** button to enter any notes in the Note Editor. Refer to Section Seven—Basic Techniques.
5. Click the **OK** button.

Steps:

To delete an existing supplier, complete the following steps.

CAUTION: Deleting a supplier from the database also deletes all the ink information that is linked to it.

---

1. Select the **Edit Suppliers…** function from the **Database** menu. This opens the Supplier Maintenance dialog.
2. Click the **Delete…** button. This opens the Delete Supplier dialog.
3. Click the **OK** button. A warning dialog appears.
4. Click the **Yes** button to delete the supplier and all the information linked to it. Click the **No** button if you do not want to delete the supplier.

SETTING UP A CALIBRATION SET

A calibration set provides a means of organizing the inks that make up your database. These are the inks that are used when formulating a match.

Calibration set parameters include the supplier, calibration method, calibration set types, substrate, k_1 and k_2 values, solvent and extender information, formula units, notes, and tags. All of these parameters define a calibration set. All the inks measured into the database for a calibration set then share these parameters. Refer to Appendix A—Sample Preparation Guide for information on the samples required.

Single Constant & Multi-Flux Calibration Methods

The Single Constant method is used for measuring the absorption property of an ink. It requires only that each calibration level of an ink be measured once (on the desired substrate). This method works well when calibrating transparent inks if you do not plan to use an opaque white ink in your mixtures.

The Multi-Flux method is used for measuring the absorption *and* scattering properties of an ink. It requires that each calibration level

for an ink be measured over a black substrate and over a white substrate. The substrate and extender calibration data is required. (If you do not enter the extender calibration data, the software assumes that the extender is perfectly clear—the calibration data is zero.) This method is used whenever your ink set contains an opaque white, or the inks have significant scattering properties.

Ink Components

Inks are available in three types of components: Light Ink, Heavy Ink, and Concentrate. Light Ink is an ink component that contains ink pigment, extender, and solvent. Heavy Ink is an ink component that contains ink pigment and extender. There is no solvent in a Heavy Ink. Concentrate is an ink component in its purest form—pigment *only*, no extender or solvent.

The following is a list of three radio button options of **Available Ink Components**.

- **Light Inks Only -** indicates that the Calibration Set contains only Light Inks. Since solvent is not added, the solvent information and fields (as well as the solvent percentage field for the extender) are disabled.
- **Light and Heavy Inks -** indicates that the Calibration Set includes Light Inks and Heavy Inks.
- **Light, Heavy, and Concentrate -** indicates that the Calibration Set includes Light Inks, Heavy Inks, and Concentrates.

Secondary Calibration Sets

A secondary calibration set uses the same parameters and inks of an original calibration set without having to recreate or re-measure the inks. Refer to the Creating a Secondary Calibration Set sub-section.

The following parameters are required when creating or editing a calibration set.

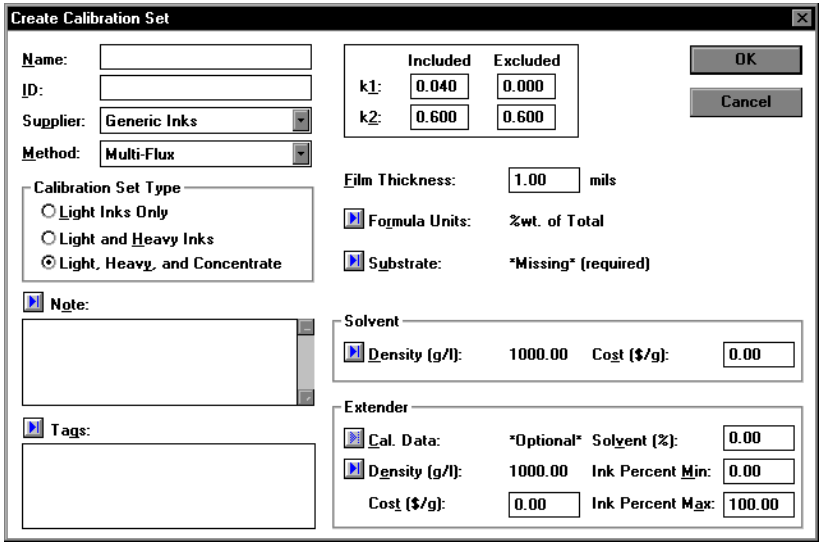
- **Name**
- **Substrate**
- **Film Thickness** (for Multi-Flux inks)
- **Solvent Density** (*not* for “Light Inks Only”)
- **Extender Density**
- **Extender Solvent Percentage** (*not* for “Light Inks Only”)

Calibration set "maintenance"—creating, editing, and deleting—allows you to establish the parameters for the calibration set, change these parameters, and remove the calibration set from your database.

It is *not* recommended to edit the $\mathbf{k_1}$ value (Fresnel reflection coefficient for incident light) and $\mathbf{k_2}$ value (Fresnel reflection coefficient of diffused light striking the surface from the inside). **IMPORTANT!** If the inks that belong to a calibration set are recalculated, *and* any reflectance value falls below k_1, you can choose to have the k_1 value *automatically* adjusted to a safe value. The k_1 and k_2 default values are as follows:

- **0°/45°:** k_1=0.00; k_2=0.60
- **Specular Included:** k_1=0.04; k_2=0.60
- **Specular Excluded:** k_1=0.00; k_2=0.60

CAUTION: Editing an existing calibration set affects all of the inks for the calibration set and the secondary calibration set (if any). Deleting a calibration set from the database deletes the substrate, all the inks for that calibration set, and any associated secondary calibration sets.



Steps:

To create a new calibration set or to edit an existing calibration set, complete the following steps.

CAUTION: Editing an existing calibration set affects all of the inks for the calibration set and any secondary calibration sets.

1. Select the **Edit Calibration Set…** function from the **Database** menu. This opens the Maintain Calibration Set dialog.
2. Click the **Create…** button (opening the Create Calibration Set dialog), *or* highlight the calibration set to be edited and click the **Edit…** button (opening the Edit Calibration Set dialog).
3. Enter or edit the calibration set's name in the **Name** field.
4. Enter or edit the calibration set's ID in the **ID** field.
5. Select the ink supplier from the **Supplier** drop down list.
6. *For creating a calibration set only*, select either the Single Constant method or the Multi-Flux method from the **Method** drop down list.
7. Select the **Available Ink Components** radio button appropriate for the calibration set.
8. *For Multi-Flux method only*, enter the film thickness in the **Film Thickness** field.
9. Click the **Formula Units** arrow button and select your formula units in the Select Formula Mode dialog. Click **OK** to set the units.
10. If necessary, enter or edit the Solvent information:
    - Enter the cost in the **Cost** field. The cost is always displayed with default units. Refer to Section Four—Setting Up Your Software.
    - Click the **Density** arrow button. Choose the units and enter the mass and the unit volume. The density is always displayed with default units. Refer to Section Four—Setting Up Your Software. Click **OK**.
11. Enter or edit the Extender information:
    - *For Multi-Flux only*, click the **Cal Data** arrow button. This opens the Over Black/Over White dialog. Measure in your extender. Refer to Section Seven—Basic Techniques.
    - Enter the cost in the **Cost** field. The cost is always displayed with default units. Refer to Section Four—Setting Up Your Software.
    - Click the **Density** arrow button. Choose the units and enter the mass and the unit volume. The density is always displayed with default units. Refer to Section Four—Setting Up Your Software. Click **OK**.

- If necessary, enter the percentage of solvent in the extender in the **Solvent (%)** field.
- Enter the minimum ink percentage in the **Ink Percent Min** field.
- Enter the maximum ink percentage in the **Ink Percent Max** field.

12. Enter or edit your substrate information:
    - Click the **Substrate** arrow button. The Substrate dialog appears.
    - If you want to paste in substrate data, click the **Paste** button. (Data must be in the clipboard for the **Paste** button to be active.) Refer to Section Eight—Managing Your Data for more information about the paste function.
    - If you want to measure in your substrate, click the **Measure…** button. Measure in your substrate. Refer to Section Seven—Basic Techniques.
    - If you want to retrieve an existing substrate from your database, click the **Retrieve…** button. Highlight the substrate you want to retrieve in the Select Substrate dialog. Click **Select…**.
    - If needed, enter the substrate's name in the **Substrate Name** field.
    - Click the **OK** button. This returns you to the Create Calibration Set dialog or the Edit Calibration Set dialog.
13. Click the **Note** arrow button to enter any notes in the Note Editor. Refer to Section Seven—Basic Techniques.
14. Click the **Tags** arrow button to assign tags to the calibration set. Refer to Section Ten—Advanced Software Features.
15. Click the **OK** button.

Steps:
To delete an existing calibration set, complete the following steps.

CAUTION: Deleting a calibration set from the database also deletes the substrate, all the inks for that calibration set, and any associated secondary calibration sets.

---

1. Select the **Edit Calibration Set…** function from the **Database** menu. This opens the Maintain Calibration Sets dialog.
2. Highlight the calibration set to be deleted in the **Calibration Sets** list.

3. Click the **Delete…** button. This opens the Delete Substrate dialog which lists the substrate(s) and inks that will also be deleted.
4. Click the **OK** button to delete the calibration set, it's substrate, all of its inks, and any associated secondary calibration sets. Click the **Cancel** button if you do not want to delete the calibration set.

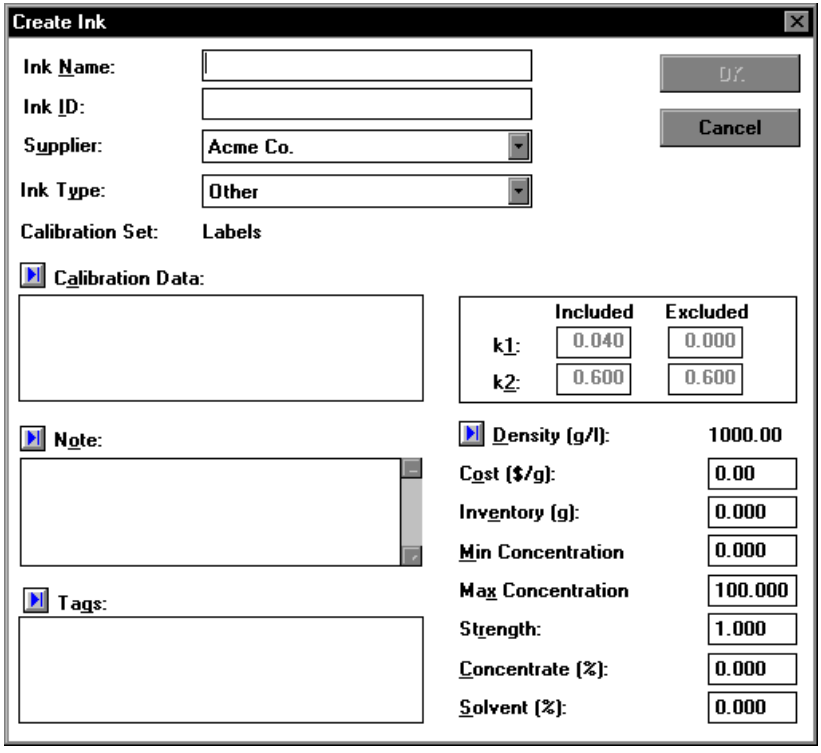
ENTERING CALIBRATION INKS

Now that the calibration set is established, inks can be entered and organized in the database. The inks calibrated and entered in the database are used by Ink-Master to formulate color matches as well as providing cost and availability during formulation. An ink is entered and calibrated by linking it to a calibration set. Therefore, any changes made to a calibration set directly affects the inks linked to it.

Ink calibration involves careful preparation and measurement of calibration level samples. Refer to Appendix A—Sample Preparation Guide for how to prepare calibration level samples. Once the ink calibration data is entered, associated ink information: cost, notes, tags, and inventory amounts, also may be entered.

If the inks belong to a "Light Inks Only" calibration set, no concentrate or solvent is added and the **Concentrate (%)** and **Solvent (%)** are disabled. If the inks belong to a "Light and Heavy Inks" calibration set, no concentrate is added and the **Concentrate (%)** is disabled. The following parameters are required when creating or editing an ink.

- **Ink Name**
- **Density**
- **Concentrate (%)** (*only* for "Concentrate")
- **Solvent (%)** (*not* for "Light Inks Only")
- **Calibration Data**



Steps:
To create information for a new ink or to edit an existing ink's information, complete the following steps.

1. Select the **Edit Ink…** function from the **Database** menu. This opens the Maintain Inks dialog.
2. Choose to create a new ink or edit an existing ink:
   - *To create a new ink*, click the **Create…** button. This opens the Create Ink dialog.
   - *To edit an existing ink*, highlight the calibration set that contains the ink to be edited in the **Calibration Sets** list. Highlight the ink to be edited in the **Inks** list. Click the **Edit…** button. This opens the Edit Ink dialog.
3. Enter or edit the ink name in the **Ink Name** field.
4. Enter or edit the ink ID in the **Ink ID** field.
5. Select the ink supplier from the **Supplier** drop down list.
6. Select the ink type from the **Ink Type** drop down list.
7. To enter or edit the Density information, follow these steps.

- Click the **Density** arrow button.
- Select the units and enter the mass and the unit volume. The density is always displayed in the default units. Refer to Section Four—Setting Up Your Software. Click **OK**.

8. Enter or edit the cost in the **Cost** field. The cost is always displayed with default units. Refer to Section Four—Setting Up Your Software.
9. Enter or edit the inventory information in the **Inventory** field. The inventory is always displayed in the default units. Refer to Section Four—Setting Up Your Software.
10. Enter or edit the minimum ink concentration in the **Min Concentration (%)** field.
11. Enter or edit the maximum ink concentration in the **Max Concentration (%)** field.
12. Enter or edit the calibration set's substrate strength in the **Strength** field.
13. If necessary, enter or edit the percentage of concentrate in the ink in the **Concentrate (%)** field.
14. If necessary, enter or edit the percentage of solvent in the ink in the **Solvent (%)** field.
15. Click the **Note** arrow button to enter any notes in the Note Editor. Refer to Section Seven—Basic Techniques.
16. Click the **Tags** arrow button to assign tags to the calibration set. Refer to Section Ten—Advanced Software Features.
17. Click the **Calibration Data** arrow button and enter or edit the ink's calibration data. Refer to the Calibration Data sub-section.
18. Click the **OK** button.

Steps:

To delete an existing ink, complete the following steps.

1. Select the **Edit Ink…** function from the **Database** menu. The Maintain Inks dialog appears.
2. Highlight the calibration set that contains the ink to be deleted in the **Calibration Sets** list.
3. Highlight the ink to be deleted in the **Inks** list.
4. Click the **Delete…** button. The Delete Ink dialog appears listing the ink that will be deleted.
5. Click the **OK** button to delete the ink. Click the **Cancel** button if you do not want to delete the ink.

Calibration Data

Once the ink's information is entered and correct, you can then measure in the ink's calibration data—the calibration level samples. Also, Ink-Master allows you to edit and delete the calibration data.

The calibration data dialog allows you to view an ink's calibration data on a graph. The graph selection varies upon which method you are calibrating with, Single Constant or Multi-Flux. Below lists the different types of graphs available for each method.

Single Constant Graph Selection:

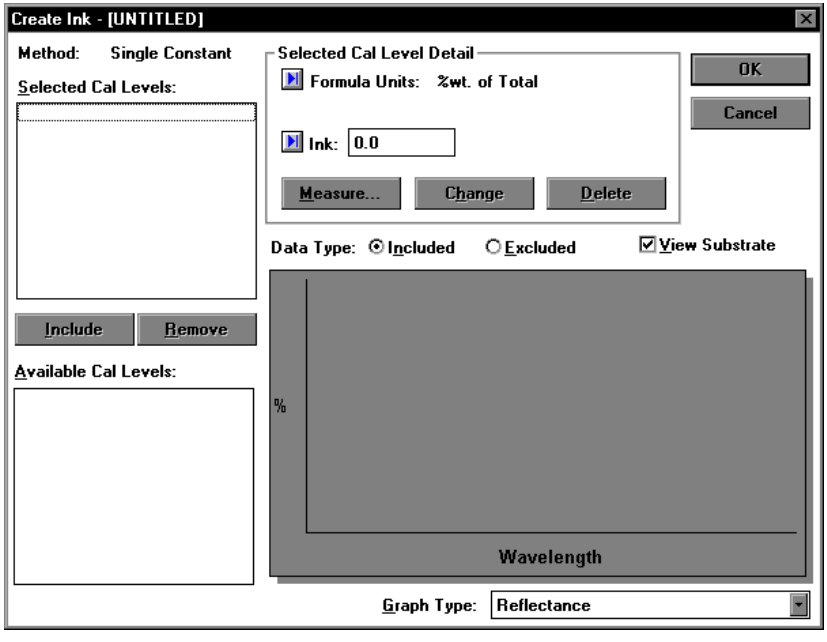
- **Reflectance vs. Wavelength** - plots the Reflectance values for each 10 Nanometer wavelength between 400 nm and 700 nm. Check the **View Substrate** check box to include it in the graph. Check the **Zoom In** check box to zoom in on the graph. (Un-check it to zoom out.)
- **Density vs. Wavelength** - plots the Density values for each 10 Nanometer wavelength between 400 nm and 700 nm. Check the **View Substrate** check box to include it in the graph. Check the **Zoom In** check box to zoom in on the graph. (Un-check it to zoom out.)
- **Density vs. Concentration** - plots the Density values against the concentration % weight for a wavelength. Check the **Auto WL** check box to let the software automatically select the wavelength with the maximum absorption. Otherwise, use the **Wavelength** up and down arrow buttons to select the wavelength to display in the graph. Check the **Zoom In** check box to zoom in on the graph. (Un-check it to zoom out.) Use the **Smoothing** up and down arrow buttons to adjust the smoothness of the curve.

Multi-Flux Graph Selection:

- **Reflectance Over White -** plots the "over white" Reflectance values for each 10 nm wavelength between 400 nm and 700 nm. Check the **View Substrate** check box to include it in the graph.
- **Reflectance Over Black -** plots the "over black" Reflectance values for each 10 nm wavelength between 400 nm and 700 nm.
- **Density Over White -** plots the "over white" Density values for each 10 nm wavelength between 400 nm and 700 nm. Check the **View Substrate** check box to include it in the graph.
- **Density Over Black -** plots the "over black" Density values for each 10 nm wavelength between 400 nm and 700 nm.
- **K vs. Wavelength -** plots the K (absorption coefficient) values against wavelength between 400 nm and 700 nm. Check the **Auto**

WL check box to let the software automatically select the wavelength with the maximum absorption. Otherwise, use the **Wavelength** up and down arrow buttons to select the wavelength to display in the graph. Check the **Zoom In** check box to zoom in on the graph. (Uncheck it to zoom out.) Use the **Smoothing** up and down arrow buttons to adjust the smoothness of the curve.

- **K vs. Concentration -** plots the K (absorption coefficient) values against the concentration % weight for a wavelength. Check the **Auto WL** check box to let the software automatically select the wavelength with the maximum absorption. Otherwise, use the **Wavelength** up and down arrow buttons to select the wavelength to display in the graph. Check the **Zoom In** check box to zoom in on the graph. (Uncheck it to zoom out.) Use the **Smoothing** up and down arrow buttons to adjust the smoothness of the curve.
- **S vs. Wavelength -** plots the S (scattering coefficient) values against wavelength between 400 nm and 700 nm. Check the **Auto WL** check box to let the software automatically select the wavelength with the maximum absorption. Otherwise, use the **Wavelength** up and down arrow buttons to select the wavelength to display in the graph. Check the **Zoom In** check box to zoom in on the graph. (Uncheck it to zoom out.) Use the **Smoothing** up and down arrow buttons to adjust the smoothness of the curve.
- **S vs. Concentration -** plots the S (scattering coefficient) values against the concentration % weight for a wavelength. Check the **Auto WL** check box to let the software automatically select the wavelength with the maximum absorption. Otherwise, use the **Wavelength** up and down arrow buttons to select the wavelength to display in the graph. Check the **Zoom In** check box to zoom in on the graph. (Uncheck it to zoom out.) Use the **Smoothing** up and down arrow buttons to adjust the smoothness of the curve.



Steps:

To create an ink's calibration data, complete the following steps.

1. Select the **Calibration Data** arrow button in the Create Ink dialog. This opens the calibration data dialog for the ink.
2. Click the **Formula Units** arrow button and select your formula units in the Select Formula Mode dialog. Click **OK** to set the units.
3. If you need to add a White Ink to the ink, follow these steps.
   - Click the **White Ink** arrow button.
   - Select a white ink from the list.
   - Click **Select**.
   - Enter the percentage of white ink added in the **White** field.
4. Click the **Ink** arrow button to view, print, or export the New Formula Report for the calibration level ink. Refer to Section Six—Formulating for more information.
5. Enter the percentage of ink for the calibration level in the **Ink** field.
6. Click the **Measure…** button. Measure in the calibration level. Refer to Section Seven—Basic Techniques.
7. *For spherical instruments only*, select the appropriate data type radio button, either **Included** or **Excluded**.

8. Click the **OK** button to return to the Create Ink dialog.

Steps:

To edit an ink's calibration data, complete the following steps.

1. Select the **Calibration Data** arrow button in the Edit Ink dialog. This opens the calibration data dialog for the ink.
2. Highlight the calibration level of the ink you want to edit in the **Selected Cal Levels** list.
3. Click the **Formula Units** arrow button and select your formula units in the Select Formula Mode dialog. Click **OK** to set the units.
4. If you need to add a White Ink to the ink, follow these steps.
   - Click the **White Ink** arrow button.
   - Select a white ink from the list.
   - Click **Select**.
   - Enter the percentage of white ink added in the **White** field.
5. Click the **Ink** arrow button to view, print, or export the New Formula Report for the calibration level ink. Refer to Section Six—Formulating for more information.
6. To move the highlighted calibration level from the **Selected Cal Levels** list to the **Available Cal Levels** list, click the **Remove** button. To move the highlighted calibration level from the **Available Cal Levels** list to the **Selected Cal Levels** list, click the **Include** button.
7. To change an ink percentage, follow these steps.
   - Highlight the desired calibration level in the **Selected Cal Levels** list.
   - Enter the new percentage of ink for the calibration level in the **Ink** field.
   - Click the **Change** button. This updates the highlighted calibration level with the new percentage.
8. To re-measure an ink, follow these steps.
   - Highlight the desired calibration level in the **Selected Cal Levels** list, *or*, if necessary, enter the correct percentage of ink for the calibration level in the **Ink** field.
   - Click the **Measure…** button. Measure in the calibration level. Refer to Section Seven—Basic Techniques.
9. Click the **OK** button to return to the Edit Ink dialog.

Steps:
To delete an ink's calibration data, complete the following steps.

1. Select the **Calibration Data** arrow button in the Create Ink or Edit Ink dialog. This opens the calibration data dialog for the ink.
2. In the **Selected Cal Levels** list, highlight the calibration level of the ink you want to delete.
3. Click the **Delete** button. The calibration level for the ink is deleted. If you did not want to delete it, click the **Cancel** button to return to the Create Ink or Edit Ink dialog.
4. To save the deletion, click the **OK** button.

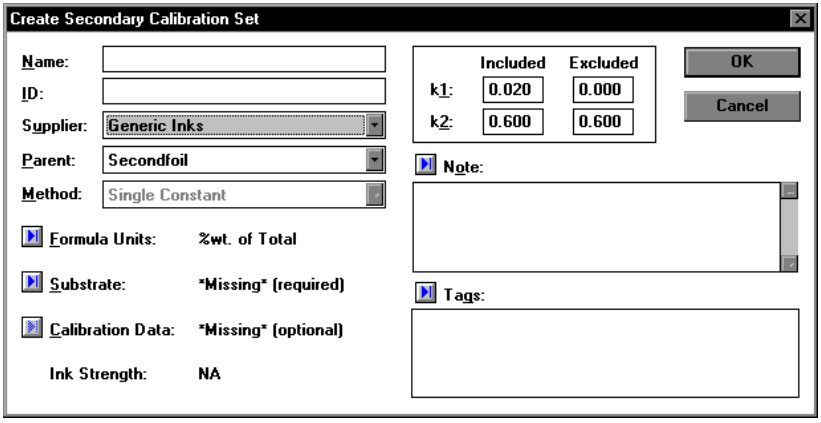
CREATING A SECONDARY CALIBRATION SET

A secondary calibration set can be created from an original calibration set. This function allows you to use all the parameters and inks of the "parent" calibration set for a new calibration set. All you need to do is enter a new calibration set name, measure in or retrieve a new substrate, and edit any of the parameters (if needed). You can also enter new calibration data for the inks to determine their strength. (Calibration data graph options are identical to the graph options when creating/editing an ink. See the Create/Edit an Ink sub-section.)

Once created, a secondary calibration set can be edited and deleted in the same manner as an original calibration set. Secondary calibration sets are listed in the Maintain Calibration Sets dialog along with original calibration sets. A secondary calibration set has a prefix to its name—**{SC}**. Refer to the Create/Edit a Calibration Set sub-section for editing a secondary calibration set.

IMPORTANT: Because secondary calibration sets are based on their parent calibration set, the following conditions apply:

- Inks can not be created in the secondary calibration set—they must be created with the parent calibration set.
- Deleting an ink from a parent calibration set also deletes it from the secondary calibration set.
- Editing or deleting a parent calibration set also affects or deletes the secondary calibration set as well as all associated inks.
- Editing or deleting a secondary calibration set does *not* affect the parent calibration set in any way.



Steps:

To create a secondary calibration set, complete the following steps.

1. Select the **Edit Calibration Set…** function from the **Database** menu. This opens the Maintain Calibration Sets dialog.
2. Highlight the calibration set you want to base your secondary calibration set on.
3. Click the **Create Secondary Calibration Set …** button. This opens the Create Secondary Calibration Set dialog. This dialog contains the information from the parent calibration set.
4. Enter the new calibration set's name in the **Name** field.
5. Select the supplier from the **Supplier** drop down list.
6. If you want to change the parent calibration set, select it from the **Parent** drop down list.
7. To edit the formula units, click the **Formula Units** arrow button and select the formula units in the Select Formula Mode dialog. Click **OK** to set the units.
8. Enter the substrate:
   - Click the **Substrate** arrow button. This opens the Substrate dialog.
   - If you want to paste in substrate data, click the **Paste** button. (Data must be in the clipboard for the **Paste** button to be active.) Refer to Section Eight—Managing Your Data for more information about the paste function.
   - If you want to measure in your substrate, click the **Measure…** button. Measure in your substrate. Refer to Section Seven—Basic Techniques.

- If you want to retrieve an existing substrate from your database, click the **Retrieve…** button. Highlight the substrate you want to retrieve in the Select Substrate dialog. Click **Select…**.
- If needed, enter the substrate's name in the **Substrate Name** field.
- Click the **OK** button. This returns you to the Create Secondary Calibration Set dialog.

9. If you want to establish the ink strength, follow these steps.
   - Click the **Cal Data** arrow button. This opens the Calibration Data dialog.
   - Select an ink from the drop down list.
   - Enter the calibration level ink percent.
   - Click the **Measure…** button. Measure in your ink. Refer to Section Seven—Basic Techniques.
   - *For spherical instruments only*, select the appropriate data type radio button, either **Included** or **Excluded**.
   - Click the **OK** button to return to the Create Secondary Calibration Set dialog. The Ink Strength is displayed.
10. Click the **OK** button.

Detach a Secondary Calibration Set

You can also detach a secondary calibration set from its parent calibration set. Detaching a secondary calibration set saves all the information associated with it separate from its original parent calibration set. Therefore, if the parent is edited or deleted, it won't affect the "detached" calibration set.

Steps:

To detach a secondary calibration set from its parent calibration set, complete the following steps.

CAUTION: Once a secondary calibration set is detached from its parent calibration set, it *can not* be reattached.

---

1. Select the **Edit Calibration Set…** function from the **Database** menu. This opens the Maintain Calibration Set dialog.
2. Highlight the secondary calibration set you want to detach.
3. Click the **Detach Secondary Calibration Set…** button. This opens the Detach Secondary Calibration set dialog.

4. Click the **Yes** button to detach the calibration set. Click the **No** button to cancel the detach function.

CREATING A SUBSTRATE LIBRARY

You may enter the substrate data for the formula match before formulation or during formulation. If you have substrates that you always keep in stock, Ink-Master provides you with substrate maintenance functions to create a library of your substrates. Refer to Section Six—Formulating for how to enter a substrate during formulation.

Substrate "maintenance"—creating, editing, and deleting—allows you to establish substrates, change substrate data, and remove substrates from your database.

CAUTION: Deleting a substrate from the database causes all formulas referencing it to become invalid.

Steps:
To create a new substrate, complete the following steps.

1. Select the **Edit Substrate…** function from the **Database** menu. This opens the Substrate Maintenance dialog.
2. Click the **Create…** button. This opens the Substrate dialog.
3. Enter the substrate's name in the **Name** field.
4. *For spherical instruments only*, select either the **Included** radio button or the **Excluded** radio button for the **Data Type**.
5. Click the **Measure…** button. Measure in your substrate. Refer to Section Seven—Basic Techniques.
6. Click the **OK** button.

Steps:
To edit an existing substrate, complete the following steps.

1. Select the **Edit Substrate…** function from the **Database** menu. This opens the Substrate Maintenance dialog.
2. Click the **Edit…** button. This opens the Substrate dialog.
3. Edit the substrate name in the **Name** field.
4. If you want to re-measure the substrate, click the **Measure…** button. Re-measure the substrate. Refer to Section Seven—Basic Techniques.
5. Click the **OK** button.

Steps:
To delete an existing substrate, complete the following steps.

CAUTION: Deleting a substrate from the database causes all formulas referencing it to become invalid.

---

1. Select the **Edit Substrate…** function from the **Database** menu. This opens the Substrate Maintenance dialog.
2. Click the **Delete…** button. This opens the Delete Substrate dialog.
3. Click the **Yes** button to delete the substrate. Click the **No** button if you do not want to delete the substrate.

SECTION SIX

Formulating

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Section Six—Formulating walks you through the process you'll need to take to generate a formula match to a standard. First, you need to specify a standard and its tolerances. Then, you can generate a formula that matches your standard. Next, mix a physical sample of the formulated match and measure it in as a trial. Based on your trial information, correct your formula. Lastly, accept the match or correction and prepare the formula to be used.

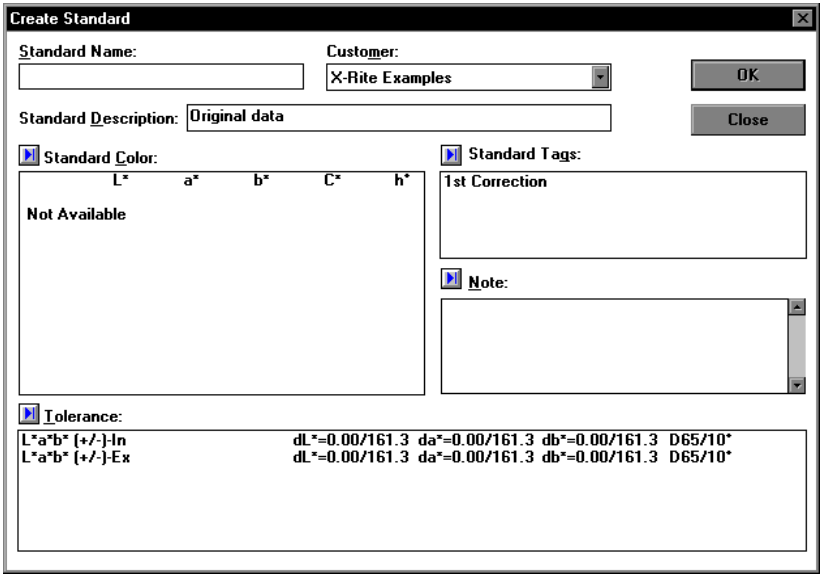
ENTERING THE STANDARD

There are two ways to choose a standard to match—create a new standard or find an existing standard. Refer to Section Seven—Basic Techniques for how to find a standard.

Create/Edit a Standard

Creating a standard allows you to enter the color data for a new standard. Standard "maintenance"—creating, editing, and deleting—allows you to establish standards, change standard information, and remove standards from your database. When editing a standard, if you choose not to rename the standard before accepting new standard data, you may save the previous standard data under an alternate standard description. Refer to Section Ten—Advanced Software Features.

CAUTION: Deleting a standard from the database also deletes all the associated samples that are linked to it.



Steps:

To create a new standard or edit an existing standard, complete the following steps.

1. Choose to create a new standard, or edit an existing standard.

- *To create a new standard*, either select the **Create Standard…** function from the **Instrument** menu. (*Or*, select the **Edit Standards…** function from the **Database** menu. This opens the Standard Maintenance dialog. Click the **Create…** button.) This opens the Create Standard dialog.
- *To edit an existing standard*, select the **Edit Standards…** function from the **Database** menu. This opens the Standard Maintenance dialog. Click the **Edit…** button. This opens the Edit Standard dialog.

2. Enter or edit the standard name in the **Standard Name** field.
3. Select the customer name from the **Customer** drop down list.
4. Enter or edit a standard description in the **Standard Description** field.
5. Click the **Standard Color** arrow button. This opens the Edit Standard Color dialog.
6. Click the **Measure…** button. Measure in your standard. Refer to Section Seven—Basic Techniques.
7. If you want to attach or detach tags, click the **Standard Tags** arrow button. This opens the Select Tags dialog. Refer to Section Ten—Advanced Software Features.
8. If you want to create or edit a note for the standard, click the **Note…** button to enter any notes in the Note Editor. Refer to Section Seven—Basic Techniques.
9. Click the **Tolerance** arrow button. This opens the Edit Tolerance dialog.
10. Create or edit the standard's tolerances. Refer to the Setting Tolerances sub-section.
11. Click the **OK** button. When editing a standard, if you didn't rename the standard, you are prompted to save the new standard data under an alternate standard description. Refer to Section Ten—Advanced Software Features.

Steps:
To delete standard, complete the following steps.

CAUTION: Deleting a standard from the database also deletes all the associated samples that are linked to it.

---

1. Select the **Edit Standards…** function from the **Database** menu. This opens the Standard Maintenance dialog. Click the **Delete…** button. This confirmation message appears.

2. Click the **Yes** button to delete the standard. Click the **No** button if you do not want to delete the standard..

SETTING TOLERANCES

When entering a standard, you need to determine the tolerances for it. Tolerance is the allowable deviation that is set for each sample that is measured to match the standard. Each standard can have up to 11 types of tolerances. Below lists and describes the available tolerances.

L*a*b* Tolerance

L*a*b* tolerancing establishes color difference limits for lightness values (**dL***), red/green values (**da***), and yellow/blue values (**db***). These tolerances cause color difference to be limited by a rectangular box in a color space. You must establish tolerance limits for each value.

L*C*h° Tolerance

L*C*h° tolerancing establishes color difference limits for lightness values (**dL***), chroma values (**dC***), and hue values (**dH***). Hue is limited by a function given by the following equation: $dH^*=[(dE^*)^2-(dL^*)^2-(dC^*)^2]^{½}$. The benefit of L*C*h° tolerancing is it reflects human perception of color more accurately than L*a*b* tolerancing. You must establish tolerance limits for each value.

ΔE_{CMC} Tolerance

ΔE_{CMC} tolerancing establishes constant limits for lightness (**l**), chromaticity (**c**), and the commercial factor (**cf**). This is an ellipsoidal tolerance method which attempts to correlate small measured color differences with visual assessment. (The CMC algorithms in Ink-Master are developed in accordance with CIE and AATCC guidelines.) You must establish tolerance limits for each value.

ΔE Tolerance

ΔE tolerancing establishes a constant limit for total L*a*b* errors, (**dE**). The Delta E tolerance causes color difference to be limited by a sphere in a color space. You must establish a tolerance limit for Delta E.

Metamerism

Metamerism is an index which quantifies the color difference expected between the standard and sample as the illuminant/observer pair changes.

You must select two different illuminant/observers and establish a high tolerance limit.

Formula used: $dE_{Illuminant1} + dE_{Illuminant2}$

Strength

Strength is an index which shows the ability of a colorant to modify the color of a material. You must establish high and low tolerance limits for each type of strength.

There are three types of strengths: Apparent, Tristimulus, and Chromatic. **Apparent** strength should be used for comparison of colors with moderate chroma and is evaluated across the entire spectrum. **Tristimulus** strength focuses on the lowest tristimulus value, indicating the highest absorbency. (Upon finding that value, it compares the absorbency of the standard and sample.) **Chromatic** strength should be used for comparison of colors with high chroma and is evaluated at the wavelength with the highest absorption. (You must select the wavelength.)

Apparent Formula: %Strength = Sum of sample absorbances / Sum of standard absorbences X 100%

Tristimulus Formula: %Strength = Sample absorbance (tristimulus) / Standard absorbance (tristimulus) X 100%

Chromatic Formula: %Strength = Sample absorbance (wavelength) / Standard absorbance (wavelength) X 100%

Yellowness Index

Yellowness index is an index for evaluation of white and near-white samples. These samples yield numbers which correlate with visual rating of yellowness. You must establish high and low tolerance limits and select the proper type of illuminant/observer:

ASTME313 Formula: Yellowness = $100(1 - .847\ ^{Z}/_{Y})$ C/2°

ASTMD1925 Formula: Yellowness = 100(1.28X - 1.06Z)/Y C/2°

Whiteness Index

Whiteness index is an index for evaluation of white and near-white samples. These samples yield numbers which correlate with visual rating of whiteness. You must establish high and low tolerance limits.

ASTME313 Formula: Whiteness = 3.37472Z - 2.99 (C/2°)

L*a*b* Asymmetric (+/-) Tolerance

L*a*b* Asymmetric tolerancing allows you to establish upper (+) and lower (-) limits for lightness values (**dL***), red/green values (**da***), and yellow/blue values (**db***). These tolerances cause color difference to be limited by a rectangular box in a color space. L*a*b* Asymmetric tolerancing allows you to set the target anywhere within the tolerance space, as opposed to L*a*b* tolerancing which places the target in the center of the tolerance space. You must establish upper and lower tolerance limits for each value.

FMC2 Tolerance

FMC2 tolerancing is based on McAdam's work of color *perceptibility* of human observers. You must establish the FMC2 Delta E limit.

Density

Density tolerancing is based on the density status type and appropriate filter response for the status. You must establish high and low limits and the filter response. However, if you want, Ink-Master can automatically select the appropriate filter response. Below is a list of the density status types with their available filter responses.

- **Status A**, **Status E**, **Status I**, and **Status T** - Cyan, Magenta, Yellow, and Visual filter responses.
- **Spectral** and **Spectral X** - the wavelength of the highest spectral density.
- **HiFi** - Cyan, Magenta, Yellow, Visual, Red, Green, and Blue filter responses.
- **Hexachrome** - Cyan, Magenta, Yellow, Visual, Green, and Orange filter responses.

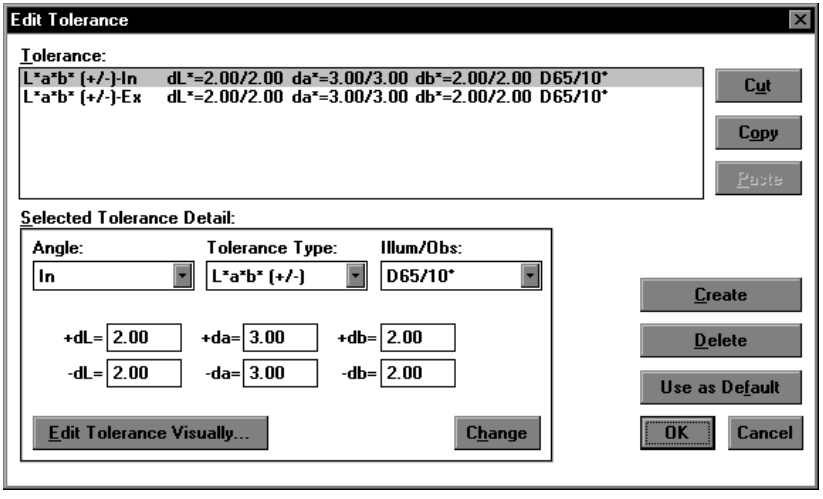
Create/Edit Tolerances

Tolerances for a standard are set (created/edited) in the Edit Tolerance dialog. This dialog contains the following items.

- **Tolerance** - This list box displays all current tolerances.
- **Cut** - This button cuts the highlighted tolerance from the **Tolerance** list box and moves it to the clipboard.
- **Copy** - This button copies the highlighted tolerance from the **Tolerance** list box to the clipboard.

- **Paste** - This button pastes the clipboard contents into the **Tolerance** list box.
- **Selected Tolerance Detail** - This area is where you select tolerancing methods and settings. This area contains the following items.
  - **Angle** - This drop down list is available for spherical instruments only. It allows you to select either an included angle (**In**) or an excluded angle (**Ex**).
  - **Tolerance Type** - This drop down list allows you to select the type of tolerance you want to use. See the above descriptions of available tolerances for more information.
  - **Illum/Obs** or **Strength Type** or **Status Type** - Depending on the Tolerance Type selected, this drop down list allows you to either select an illuminant observer *or* the strength type *or* a density status type. (*For **Density** tolerance type only*, an additional drop down list, **Filter Response**, and an **Auto Pick** check box appear. The **Filter Response** drop down list allows you to determine the appropriate density status filter response. The **Auto Filter** check box lets Ink-Master determine the appropriate density status filter response.)
  - **<limit>** - These fields allow you to enter the appropriate tolerance limits. These fields depend on the Tolerance Type selected.
  - **Change** - This button replaces the highlighted tolerance in the **Tolerance** list box with the current settings in the **Selected Tolerance Detail** area.
  - **Edit Tolerance Visually…** - This button opens the Visual Tolerance Editor dialog which allows you to edit the following tolerances visually: **L*a*b***, **L*C*H***, **CMC**, **Delta E**, **L*a*b* (+/)**, and **DE (FMC2)**. Refer to Section Ten—Advanced Software Features. (**NOTE:** This function is only available for standards with existing samples.)
- **Create** - This button adds the current settings in the Selected Tolerance Detail area as a new tolerance in the **Tolerance** list box.
- **Delete** - This button *permanently* removes the highlighted tolerance from the **Tolerance** list box.
- **Use as Default** - This button sets the current tolerance(s) in the **Tolerance** list box as the default tolerance(s) for all new standards.
- **OK** - This button accepts the current tolerance(s) in the **Tolerance** list box as the tolerance(s) for the standard and returns to the Create Standard dialog or Edit Standard dialog. Refer to the Entering the Standard sub-section.

- **Cancel** - This button does not accept any of the tolerance settings in the Edit Tolerance dialog and returns to the Create Standard dialog or Edit Standard dialog. Refer to the Entering the Standard sub-section.



Steps:
To create or edit your tolerance settings, complete the following steps.

1. To create a tolerance based on an existing tolerance *or* to edit an existing tolerance, highlight the desired tolerance in the **Tolerance** list box
2. *For spherical instruments only*, select the appropriate angle, included (**In**) or excluded (**Ex**), from the **Angle** drop down list.
3. Select the tolerance type from the **Tolerance Type** drop down list.
4. Depending on the tolerance type, select the illuminant/observer(s) from the **Illum/Obs** drop down list(s) or select the strength type from the **Strength Type** drop down list. (*For **Density** tolerance type only*, select the status type from the **Status Type** drop down list. *Then* determine the filter response by selecting it from the **Filter Response** drop down list *or* checking the **Auto Filter** check box.)
5. Depending on the tolerance type, enter the necessary limit(s) in the limit field(s). If you want to visually edit the tolerances, click the **Edit Tolerance Visually…** button. This opens the Visual Tolerance Editor dialog. Refer to Section Ten—Advanced Software Features.

6. To create a new tolerance, click the **Create** button. To edit a tolerance, click the **Change** button.
7. Repeat steps 1 through 6 for each tolerance you want to create or edit.
8. Click the **OK** button. This sets the current tolerance(s) for the standard and returns to the Create Standard dialog or Edit Standard dialog. Refer to the Entering the Standard sub-section.

FORMULATING A MATCH

Once the standard is entered, you can formulate an ink match for the standard. This process includes selecting your inks, setting the formulation conditions, viewing the results, and accepting an initial formula. To generate a formula from a trial, refer to Section Ten—Advanced Software Features. To formulate a series of matches from the Request Queue, refer to Section Ten—Advanced Software Features.

Steps:

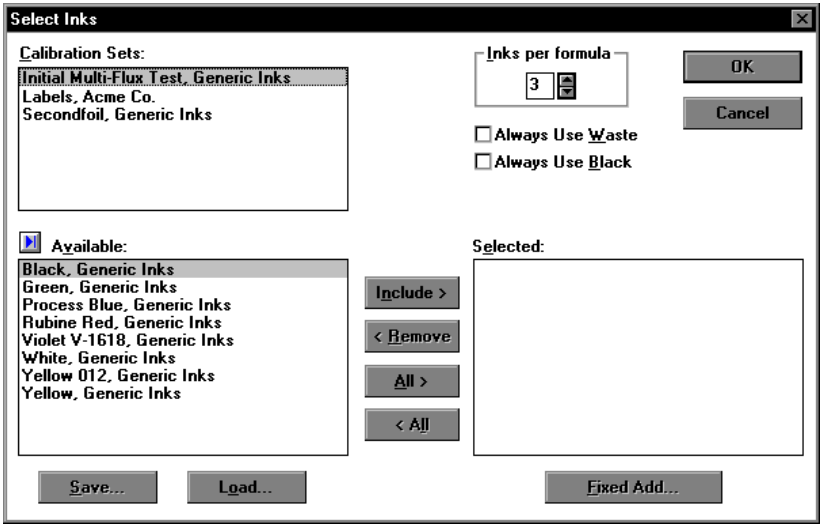
To begin the formulation process, select the **Combinatorial…** function from the **Formulation** menu. This opens either the Select Inks dialog or the Combinatorial Formulation dialog.

NOTE: If no ink set has been previously selected, the Select Inks dialog is automatically displayed. If an ink set has been previously selected, the Combinatorial Formulation dialog is automatically displayed.

The Select Inks dialog allows you to determine your ink set for the formulation process. The Combinatorial Formulation dialog allows you to determine all of the factors needed for an ink formula match. It also displays the formula match results and provides access to formula reports. For more information about formula reports, refer to the Accepting a Match or Correction sub-section. To formulate a series of matches from the Request Queue, refer to Section Ten—Advanced Software Features.

Selecting Inks

If no inks have been selected previous to performing a combinatorial formulation, the software automatically prompts you to select your formulation inks. This is done in the Select Inks dialog. Refer to Section Ten—Advanced Software Features for advanced methods of selecting inks.



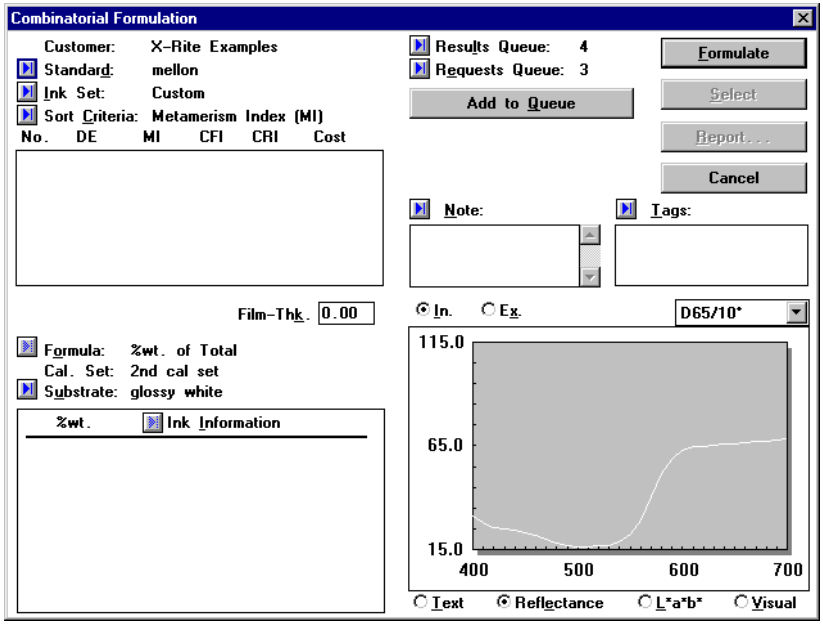
Steps:
To select inks for formulation, complete the following steps.

1. In the **Calibration Sets** list box, highlight the calibration set that contains the inks you want to use. All of the inks in the calibration set appear in the **Available** list box.
2. Highlight the ink you want to select in the **Available** list box and click the **Include >** button to move it to the **Selected** list box. (To remove an ink from the **Selected** list box, highlight it and click the **Remove <** button.) Use the "**All**" buttons to move all of the inks from one list box to another.
3. Enter the amount of inks to be used in the formula in the **Inks per Formula** field or use the up and down arrow buttons to change the current value.
4. If you want to always use waste ink in your formula, click the **Always Use Waste** check box. This check box is only available if the current calibration set contains a waste ink. Refer to Section Ten—Advanced Software Features for more information about waste inks.
5. If you want to always use black ink in your formula, click the **Always Use Black** check box.
6. If you want to always use white ink in your formula, click the **Always Use White** check box. This check box is only available if the current calibration set contains a white ink.

7. If you want to set the percent add, simply highlight it, click the **Fixed Add…** button, enter the percentage, and click the **OK** button.
8. Click the **OK** button. This opens (or returns to) the Combinatorial Formulation dialog.

Selecting Formulation Conditions

Once in the Combinatorial Formulation dialog and before actually creating a formula you need to specify the conditions for the formula. Once the conditions are set, you may add it to the Requests Queue. For more information about using the Manage Queues, refer to Section Ten—Advanced Software Features.



Steps:

To select the formulation conditions, complete the following steps.

1. If the currently selected standard is not correct, click the **Standard** arrow button. This opens the Find Standard dialog. Refer to Section Seven—Basic Techniques for finding a standard.
2. If needed, click the **Ink Set** arrow button to select your inks and follow the steps in the Selecting Inks sub-section.

3. Click the **Sort Criteria** arrow button. This opens the Sort Order dialog. Select the method of sorting from the list and click **Select**.
4. If your ink set includes a "White" ink, you may choose Loading Options:
   - If you check the **Fixed Loading** check box, enter the percent ink in the **% Ink** field.
   - If you check the **Fixed Opacity** check box *and* the standard was measured in with the Contrast Ratio method, the opacity is automatically entered in the **% Opacity** field, *otherwise* enter the percent opacity in the **% Opacity** field.
   - The film thickness defaults to the calibration set film thickness. If you want to change it, enter the correct film thickness in the **Film-Thk.** field.
5. If the currently selected substrate is not correct, click the **Substrate** arrow button. This opens the Substrate dialog.
   - *For spherical instruments only*, select either the **Included** radio button or the **Excluded** radio button for the **Data Type**.
   - If you want to measure in your substrate, click the **Measure…** button. Measure in your substrate. Refer to Section Seven—Basic Techniques.
   - If you want to retrieve an existing substrate from your database, click the **Retrieve…** button. Highlight the substrate you want to retrieve in the Select Substrate dialog. Click **Select…**.
   - If you want to select the substrate that is used for the calibration set, click the **Cal. Set** button.
   - If needed, enter the substrate's name in the **Substrate Name** field.
   - Click the **OK** button. This returns you to the Combinatorial Formulation dialog.

Formulating an Ink Match

Once all of the conditions are set in the Combinatorial Formulation dialog, you can formulate an ink match. Once a formula is created, you may add notes and tags.

Steps:

To formulate an ink match, complete the following steps.

1. Click the **Formulate** button. The number of formula combinations are displayed next to **Formula: Combinations**, and the closest matches are displayed beneath the **Sort Criteria**.
2. To stop the software from formulating, click the **Abort** button.
3. Click the **Note** arrow button to enter any notes in the Note Editor. Refer to Section Seven—Basic Techniques.
4. Click the **Tags** arrow button to assign tags to the calibration set. Refer to Section Ten—Advanced Software Features.

Viewing the Results

After the software has formulated ink matches, you may view the results in both formula form and color data form. The formula is displayed in the formula display area below the **Substrate** information and the color data is displayed in the lower right corner of the Combinatorial Formulation dialog. To edit the formula, refer to Section Ten—Advanced Software Features.

Below is a list of display options for the match's color data.

- **Text -** This radio button lists the L*, a*, b*, C*, h*, DH, and DE values for the standard and the sample (match), as well as Delta values.
- **Reflectance -** This radio button displays the standard curve (in white) and the sample curve in either green (pass) or red (fail) on a reflectance graph.
- **L*a*b* -** This radio button displays the standard (in white) and the sample in either green (pass) or red (fail) on a L*a*b* graph.
- **Visual -** This radio button displays a visual representation of the color difference between the standard and the sample.

Steps:

To view your formula results, complete the following steps.

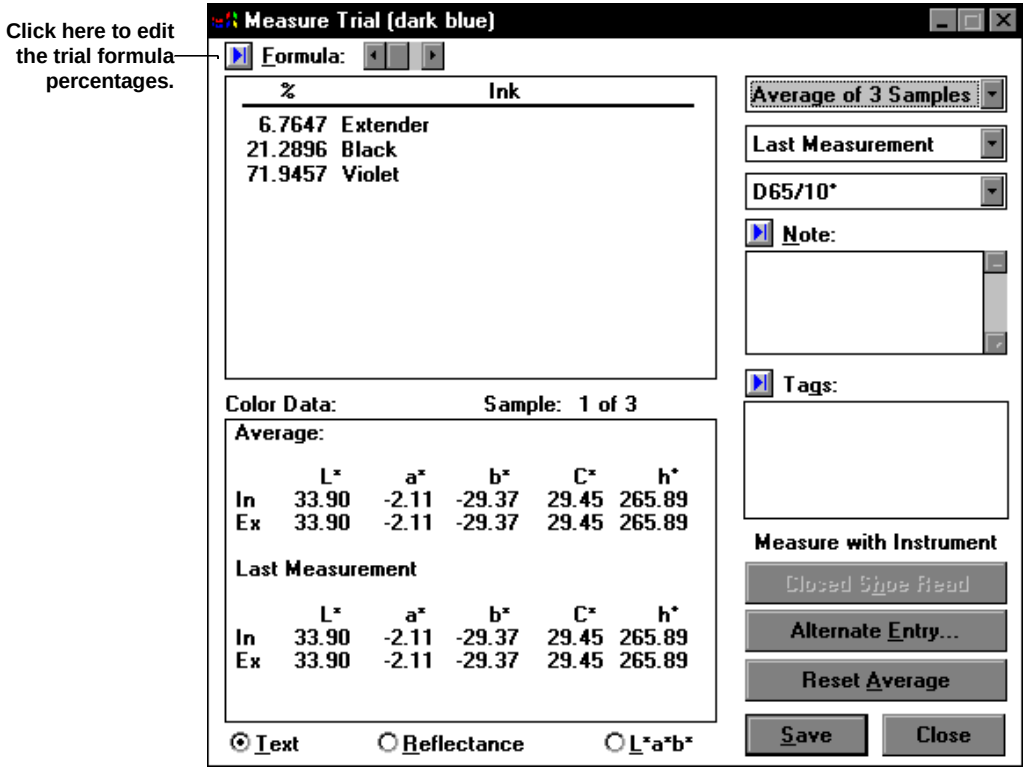
1. In the list box below the **Sort Criteria**, highlight the formula you want to view.
2. To view the ink information for the formula, click the **Ink Information** arrow button in the formula display area. This opens the Ink Information dialog.
3. To view the color data for the match, first select the illuminant/observer from the drop down list above the display area. *For spherical instruments only,* select either the **Included** radio button or the **Excluded** radio button for the data type. Then

select the appropriate radio button to display the match's color data: **Text**, **Reflectance**, **L*a*b***, or **Visual**.

4. To view either of the queues, simply click the **Requests Queue** arrow button or the **Results Queue** arrow button. For more information about queues, refer to Section Ten—Advanced Software Features.

TESTING THE MATCH

Once formulation is complete, you should measure a physical sample of the formula match—a trial. Refer to Section Ten—Advanced Software Features for more information about using waste ink from a trial and formulating from a trial. Trial measurements are done in the Measure Trial dialog.



Steps:

To measure your trial, complete the following steps.

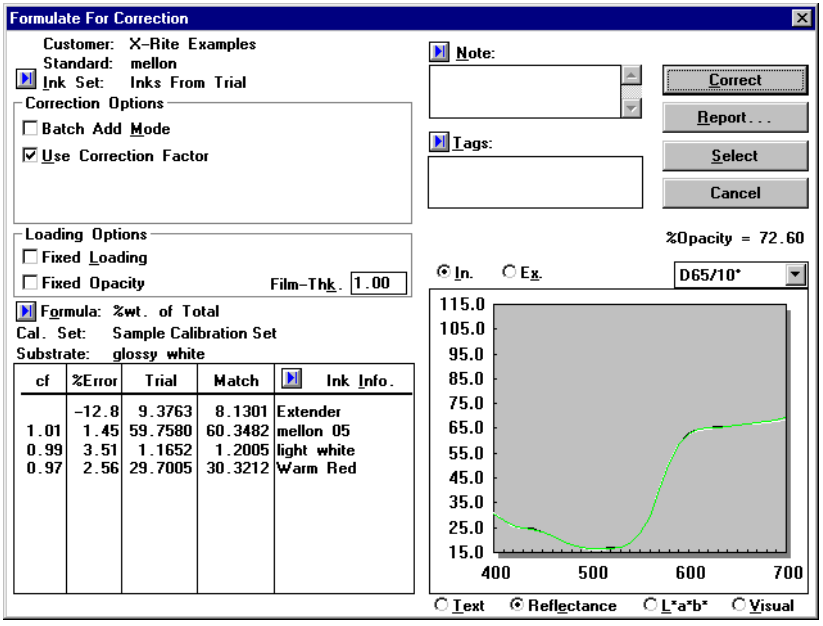
1. Select the **Measure Trial…** function from the **Instrument** menu. This opens the Measure Trial dialog for the current standard.
2. Measure the trial. Refer to Section Seven—Basic Techniques.
3. Click the **Save** button.

IMPROVING THE MATCH

If you found that your trial sample is close, but not an acceptable match, the next step to improving your ink match is to correct the formula. The Formulate for Correction dialog contains the same items as the Combinatorial Formulation dialog *without* the queue functions and with the *addition* of the following **Correction Options**.

- **Batch Add Mode -** This check box indicates that you want to perform a Batch Add correction. Refer to Section Ten—Advanced Software Features.
- **Use Correction Factors -** This check box indicates that you want to include correction factors for correcting the formula. Correction factors allow Ink-Master to consider the difference between theoretical ink performance and actual performance of the measured trial.

CAUTION: If you suspect a trial was improperly measured, *do not* use correction factors. This eliminates Ink-Master using incorrect data that may influence the formula correction.



Steps:

To correct the trial, complete the following steps.

1. Select the trial you want to correct from the sample set in the Controls window.
2. Select the **Correction…** function from the **Formulation** pull down menu. This automatically corrects the trial and opens the Formulate for Correction dialog.
3. Modify any of the settings in the dialog. Refer to the Formulating a Match sub-section for more information.
4. If desired, check the **Correction Factors** check box. For Batch Add Mode, refer to Section Ten—Advanced Software Features.
5. Click the **Correct** button.

Viewing the Correction Results

After the software has formulated the correction, you may view the results in both formula form and color data form. The formula is displayed in the formula display area below the **Substrate** information. Correction Factors, percent error, percent trial, percent match, and ink information are listed in the formula display area. Trial and correction color data are displayed in the lower right corner of the Formulate for Correction dialog.

Trial color data is white and correction color data is green. To edit the formula, refer to Section Ten—Advanced Software Features.

Below is a list of display options for the color data.

- **Text** - This radio button lists the L*, a*, b*, C*, h*, DH, and DE values for the standard and the sample (match), as well as Delta values.
- **Reflectance** - This radio button displays the standard curve (in white) and the sample curve in either green (pass) or red (fail) on a reflectance graph.
- **L*a*b*** - This radio button displays the standard (in white) and the sample in either green (pass) or red (fail) on a L*a*b* graph.
- **Visual** - This radio button displays a visual representation of the color difference between the standard and the sample.

Steps:
To view your correction results, complete the following steps.

1. To view the ink information for the formula, click the **Ink Information** arrow button in the formula display area. This opens the Ink Information dialog.
2. To view the trial and correction color data, first select the illuminant/observer from the drop down list above the display area. *For spherical instruments only*, select either the **Included** radio button or the **Excluded** radio button for the data type. Then select the appropriate radio button to display the color data: **Text**, **Reflectance**, **L*a*b***, or **Visual**.

ACCEPTING A MATCH OR CORRECTION

If you want to accept an initial formula match or a formula correction, you may select it to be included in the sample set and prepare the formula for use. Accepting (selecting) a formula is done in either the Combinatorial Formulation or Formulate for Correction dialog.

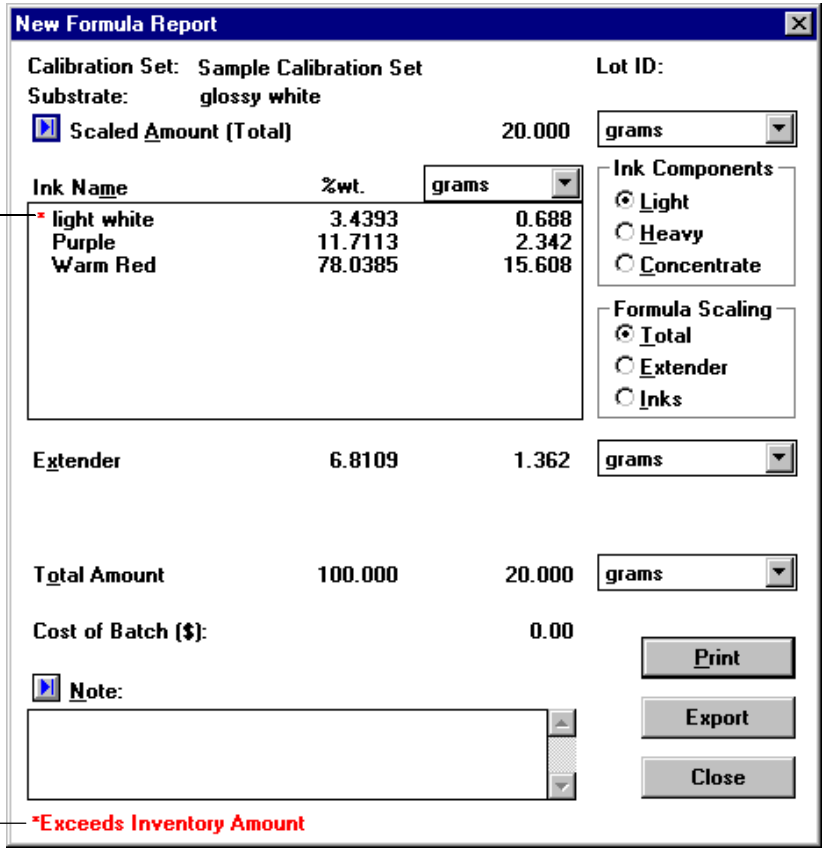
To prepare a formula for use, Ink-Master allows you to view, modify, print, and export the formula's report. This is done in the New Formula Report dialog. This dialog contains the following items.

NOTE: All percentage units are determined by the selected calibration set. Refer to Section Five—Establishing Your Database. For information about amount defaults, refer to Section Four—Software Setup Options.

- **Calibration Set** - This shows the current calibration set used for the formula.
- **Lot ID** - This shows the Lot ID of the sample.
- **Substrate** - This shows the name of the substrate for the formula.
- **Scaled Amount <type of scaling>** - This arrow button opens the Edit Amount dialog where you enter the scaled amount. The scaled amount is displayed to the right of this item. The type of scaling is determined by the **Formula Scaling** radio button currently selected. The units drop down list allows you to select the units for the scaled amount.
- **Ink Display area** - This area lists the names of the inks in the formula as well as their percentages and amounts. The units drop down list in this area allows you to select the units for the ink amounts. If these units are changed, all other units in the dialog reflect this change. If an amount exceeds the inventory amount, it is indicated by a red asterisk with an "Exceeds Inventory Amount" note at the bottom of the dialog.
- **Ink Components** - These radio buttons determine the type of ink component used in the formula.
  - **Light** - This radio button indicates that only Light Ink components are used in the formula. All solvent information is disabled on the report if this radio button is selected.
  - **Heavy** - This radio button indicates that only Heavy Ink components are used in the formula.
  - **Concentrate** - This radio button indicates that only Concentrate is used in the formula.
- **Formula Scaling** - These radio buttons determine the type of scaling used to display the formula. The selected type of scaling is displayed in the **Scaled Amount** display line.
  - **Total** - This radio button indicates that the formula is scaled to the total amount of all the inks, the extender, and the solvent.
  - **Extender** - This radio button indicates that the formula is scaled to the amount of the extender only.
  - **Inks** - This radio button indicates that the formula is scaled to the total amount of the inks only.

- **Extender** - This display line shows the percentage and the amount of the extender in the formula. The units drop down list in this display line allows you to select the units for the extender amount.
- **Solvent** - This display line shows the percentage and the amount of the solvent in the formula. The units drop down list in this display line allows you to select the units for the solvent amount. This display line is *disabled* if the **Light** radio button is selected for the Ink Mixture type.
- **Total Amount** - This display line shows the percentage and the total amount of the formula. The units drop down list in this display line allows you to select the units for the total formula amount.
- **Cost of Batch** - This display line shows the cost of the batch.
- **Note** - This arrow button opens the Note Editor. The note is displayed in the note box. Refer to Section Seven—Basic Techniques.
- **Print** - This button allows you to print the formula report. If the **Auto Inventory** item is checked in the **Options** pull down menu, the Edit Inventory Amount dialog is displayed to allow you to edit the inventory amounts before the report is printed.
- **<Export>** - This button is *optional*. It allows you to export the formula report (possibly to a dispenser). The name of this button is determined in the Formula Options function, as well as whether or not this function is enabled. Refer to Section Four—Software Setup Options.
- **Close** - This button closes the New Formula Report dialog.

Red asterisk indicates that the ink exceeds the inventory amount.



Steps:

To accept a formula and prepare it to be used, complete the following steps.

1. Select the formula as a sample.
   - To select an initial match formula, in the list box below the **Sort Criteria**, highlight the formula you want to select. Click the **Select** button in the Combinatorial Formulation dialog.
   - To select a corrected formula, simply click the **Select** button in the Formulate for Correction dialog.
2. Click the **Report…** button. This opens the New Formula Report dialog.
3. Select the units for the inks.
4. Select the desired **Formula Scaling** radio button.

5. Click the **Scaled Amount** arrow button.
6. Enter the scaled amount and click **OK**.
7. Select the units for the scaled amount.
8. Select the desired **Ink Components** radio button.
9. Select the units for the extender.
10. If available, select the units for the solvent.
11. Select the units for the total amount.
12. Click the **Note** arrow button to enter any notes in the Note Editor. Refer to Section Seven—Basic Techniques.
13. If you want to print the report, click the **Print** button. If prompted, you may edit the inventory amounts (and units), then click **OK**.
14. If you want to export the report, click the **<Export>** button.
15. When finished with the report, click the **Close** button.

SECTION SEVEN

Basic Techniques

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Section Seven covers basic techniques used when running the Ink-Master software. These basic techniques include taking measurements, printing, using the Note Editor, adding tags & notes to samples, accepting or rejecting samples, and finding data.

TAKING A MEASUREMENT

Taking a measurement is a fundamental skill used to establish your database and to formulate ink matches. Whether the software requires you to measure a substrate, standard, ink, extender, or trial, most measurement opportunities provide you with the same techniques for taking a measurement.

Color data is entered in a number of ways. While measuring the color with an instrument is the most common entry method, Ink-Master provides alternate entry methods. These alternate entry methods are covered in Section Ten—Advanced Software Functions.

NOTE: If you need to take "Closed Shoe" measurements, be sure to select this instrument mode. Refer to Section Four—Software Setup Options.

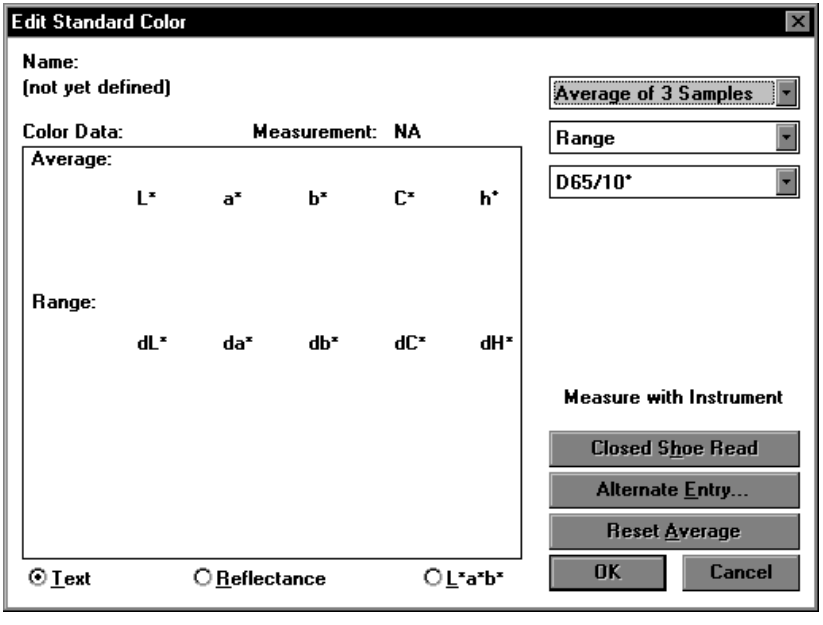
Measure a Sample Color

This is used for substrates, standards, and single constant ink calibration. Substrates, standards, and single constant inks use the same measuring techniques as well as sharing the same dialog. This measurement dialog contains the following items.

- **Name** - This states the name of the substrate, standard, or ink.
- **Averaging** - This drop down list allows you to select the type of measurement averaging you want to perform. Averaging is recommended if your sample is less than perfect.
  - **No Averaging** - only one measurement is taken.
  - **Average of 2 Samples** - two measurements are taken and averaged.
  - **Average of 3 Samples** - three measurements are taken and averaged.
  - **Average of 4 Samples** - four measurements are taken and averaged.
  - **Average of 5 Samples** - five measurements are taken and averaged.
  - **Average of 20 Samples** - twenty measurements are taken and averaged.
- **Statistical Computation** - This drop down list allows you to select the type of computation results displayed in the **Color Data** information box.
  - **Range -** range data is computed.
  - **Standard Deviation -** standard deviation data is computed.

  - **Last Measurement -** only the last measurement is displayed.
- **Illuminant/Observer** - This drop down list allows you to select the illuminant/observer you want to use. A standard list of illuminant/observers is available.
- **Color Data -** This information box displays the measurement color data specific to the type of averaging and statistical computation you selected.
- **Text** - This radio button displays the color data in text form.
- **Reflectance** - This radio button displays the color data in reflectance graphs.
- **L*a*b*** - This radio button displays the color data in L*a*b* graphs.
- **Closed Shoe Read** - This button takes a closed shoe measurement. This button is active only if the software is in the Closed Shoe instrument mode. Refer to Section Four—Setting Up Your Software.
- **Alternate Entry** - This button opens the Alternate Reflectance Entry dialog. Refer to the Alternate Entry Methods sub-section.
- **Reset Average -** This button clears all averaging color data and re-starts the averaging measurement sequence.
- **OK** - This button accepts the measurement data.
- **Cancel -** This button does not accept the measurement data and closes the measure dialog.

NOTE: While taking "averaging" measurements, graphs display all measurements (in blue) as well as the average of those measurements (in black). Once the last averaging measurement is taken, graphs display only the average (in black).



Steps:

To measure a substrate, a standard, a Single Constant ink, or a Single Constant extender, complete the following steps. If you want to enter color data by an alternate method, click the **Alternate Entry…** button and refer to Section Ten—Advanced Software Features.

1. Select your averaging method from the **Averaging** method drop down list.
2. Select your statistical computation method from the **Statistical Computation** method drop down list.
3. Select your illuminant/observer from the **Illuminant/Observer** drop down list.
4. Select the appropriate radio button (**Text**, **Reflectance**, or **L*a*b***) for the form of color data displayed.
5. Follow the **Measurement** prompt and take your measurement(s). (Click the **Closed Shoe Read** button if taking a closed shoe measurement.)
6. Click the **OK** button.

Measure a Sample Color & Opacity

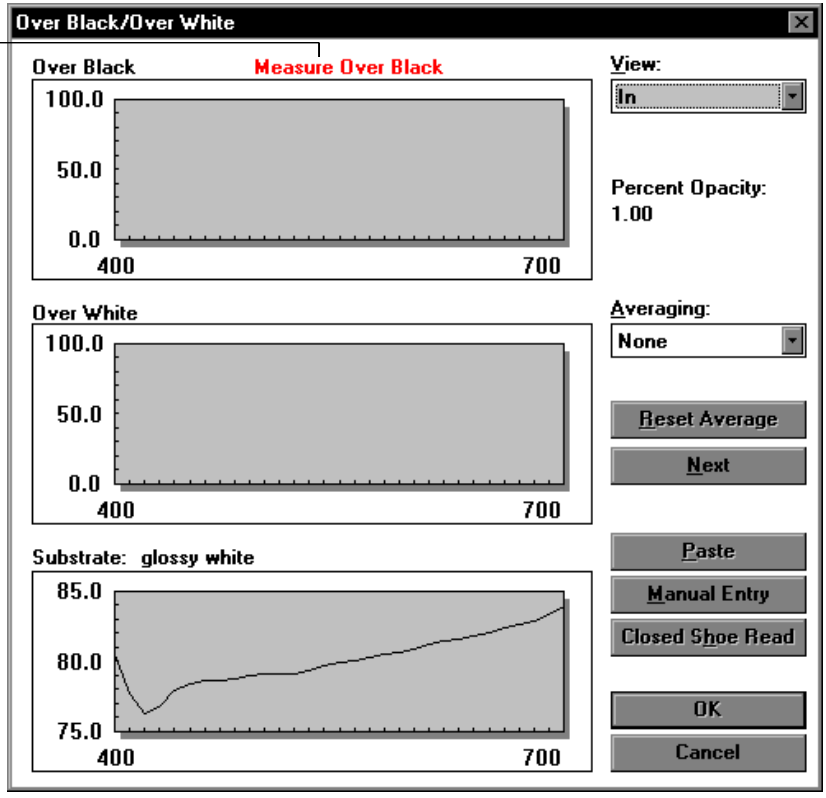
This is used for Multi-Flux ink calibration. Multi-Flux inks and extenders use the “Over Black, Over White” measuring technique. This technique

provides a way to measure color data when the opacity is *not* 100 percent. This technique requires that you measure the ink or extender over a black substrate to measure scattering properties and over a white substrate to measure absorption properties. These measurements are done in the Over Black/Over White dialog. The Over Black/Over White dialog contains the following items.

- **Over Black -** This graph displays the reflectance values for the over black measurement. When the graph has focus, a prompt appears in red text at the top of the graph to indicate measurement.
- **Over White -** This graph displays the reflectance values for the over white measurement. When the graph has focus, a prompt appears in red text at the top of the graph to indicate measurement.
- **Substrate -** This graph displays the reflectance values for the substrate. This data is optional. You may automatically measure the substrate as a part of the measurement process, or you may retrieve substrate data from the database. When the graph has focus, a prompt appears in red text at the top of the graph to indicate measurement.
- **View** - This drop down list allows you to select Included or Excluded data to display. *For spherical instruments only!*
- **Film Thickness -** This field is where you enter the film thickness of the ink. Film thickness units are determined in the Units of Measure function. Refer to Section Four—Software Setup Options.
- **Percent Opacity** - This reports the percent opacity of the ink.
- **Averaging** - This drop down list allows you to select the type of measurement averaging you want to perform. The prompt below the drop down list states where you are in the measurement process (e.g., Measure 2 of 4).
  - **No Averaging** - only one measurement is taken.
  - **Average of 2 Samples** - two measurements are taken and averaged.
  - **Average of 3 Samples** - three measurements are taken and averaged.
  - **Average of 4 Samples** - four measurements are taken and averaged.
  - **Average of 5 Samples** - five measurements are taken and averaged.
  - **Average of 20 Samples** - twenty measurements are taken and averaged.
- **Reset Average** button - clears all averaging color data and re-starts the averaging measurement sequence.

- **Next** - This button allows you to move the focus from one measurement graph to another.
- **Paste** - This button pastes color data from the clipboard into the graph that has focus.
- **Manual Entry** - This button opens the Enter Reflectances dialog which allows you to manually enter color data for the graph that has focus. Refer to the Alternate Entry Methods sub-section.
- **Closed Shoe Read** - This button takes a closed shoe measurement.
- **OK** - This button accepts the measurement data.
- **Cancel** - This button does not accept the measurement data and closes the measure dialog.

NOTE: While taking "averaging" measurements, graphs display all measurements (in blue) as well as the average of those measurements (in black). Once the last averaging measurement is taken, graphs display only the average (in black).



Steps:

To measure a Multi-Flux ink or Multi-Flux extender, complete the following steps. If you want to enter color data by manual entry, click the **Manual Entry** button and refer to Section Ten—Advanced Software Features.

1. *For spherical instruments only*, select **In** (included) or **Ex** (excluded) from the **View** method drop down list.
2. Enter the film thickness in the **Film Thickness** field.
3. Select your averaging method from the **Averaging** method drop down list.
4. Follow the red text prompts and take your measurement(s). (Click the **Closed Shoe Read** button if taking a closed shoe measurement.)
5. If you want to paste color data into the graph that has focus, click the **Paste** button.

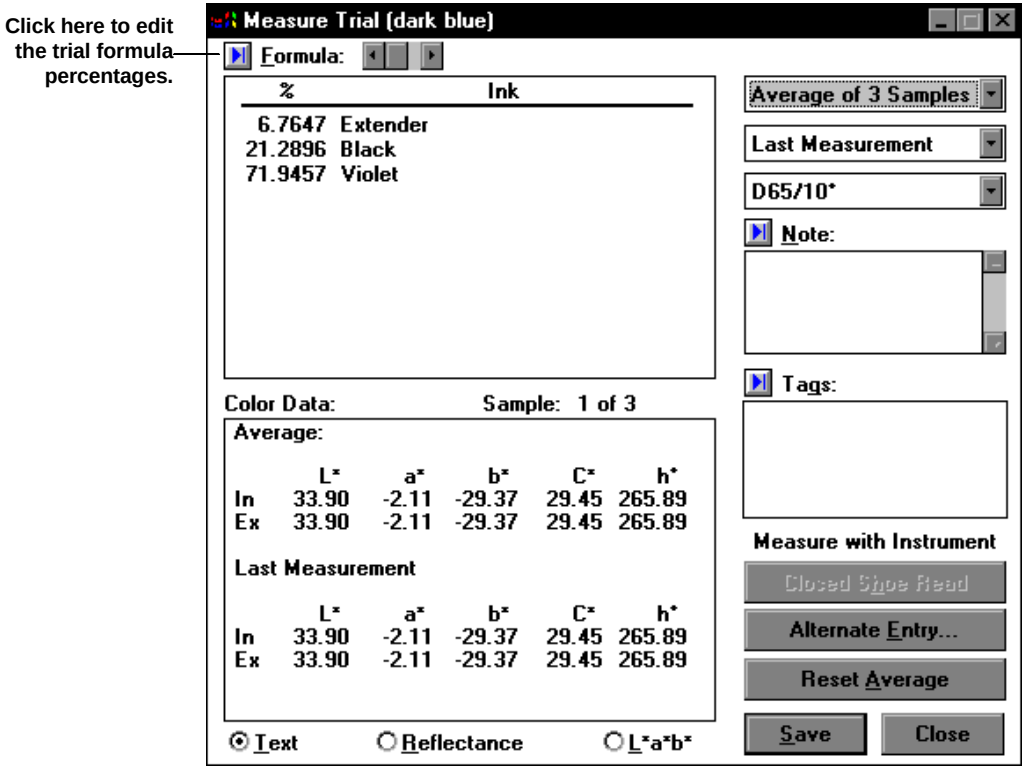
6. If you want to retrieve substrate color data, click the **Retrieve Substrate** button, highlight a substrate from the list, and click the **Select…** button.
7. Click the **OK** button.

Trials

Trials use the same dialog as the substrate, standard, and Single Constant ink measuring dialog with additional information specific to trial measurements. The Measure Trial dialog contains the following items *in addition* to the substrate, standard, and Single Constant ink and extender measurement dialog.

- **Formula -** This arrow button opens the Edit Trial Formula dialog which allows you to edit the trial's formula. Refer to Section Ten—Advanced Software Features.
- **Formula** - This scroll bar allows you to select the trial's formula to display from the sample set specified in the Controls window.
- **Formula** - This information box displays the formula for the selected sample.
- **Note** - This arrow button opens the Note Editor. Refer to the Using the Note Editor sub-section.
- **Tags** - This arrow button opens the Select Tags dialog. Refer to Section Ten—Advanced Software Features.
- **Save** - This button accepts the measurement data.
- **Close -** This button does not accept the measurement data and closes the measure dialog.

NOTE: While taking "averaging" measurements, graphs display all measurements (in cyan) as well as the average of those measurements (in black). Once the last averaging measurement is taken, graphs display only the average (in black).



Steps:

To measure a trial, complete the following steps. If you want to enter color data by an alternate method, click the **Alternate Entry…** button and refer to Section Ten—Advanced Software Features.

1. Select the trial formula using the **Formula** scroll bar.
2. Select your averaging method from the **Averaging** method drop down list.
3. Select your statistical computation method from the **Statistical Computation** method drop down list.
4. Select your illuminant/observer from the **Illuminant/Observer** drop down list.
5. If you want to enter a note, click the **Note** arrow button. This opens the Note Editor. Refer to the Using the Note Editor sub-section.

6. If you want to attach a tag, click the **Tags** arrow button. This opens the Select Tags dialog. Refer to Section Ten—Advanced Software Features.
7. Select the appropriate radio button (**Text**, **Reflectance**, or **L*a*b***) for the form of color data displayed.
8. Follow the **Measurement** prompt and take your measurement(s). (Click the **Closed Shoe Read** button if taking a closed shoe measurement.)
9. Click the **Save** button.

PRINTING COLOR DATA

Ink-Master offers a wide variety of methods to output your measurement data—quick screen prints, general reports, conformance reports, complete reports, and customized reports. You may even export customized reports.

To be sure your printers are set up the way you want it, you can use the **Print Setup…** function in the **File** pull down menu. This opens the Print Setup dialog. This dialog is a standard Windows Print Setup dialog and contains printer selection functions, orientation options, and paper size and source options. The **Options…** button in this dialog opens the Windows printer options and properties. Refer to your Windows documentation for more information.

Print the Application Screen

Ink-Master allows you to print all the screen's contents. You may want to set up the screen with the desired standard, samples, and views. Refer to Section Nine—Viewing Your Data for more information.

NOTE: To print an individual window, you must select **Print** in the window's View Specific pull down menu. Refer to Section Nine—Viewing Your Data for more information about View Specific menus.

Steps:

To print *all* the screen contents, simply click the **Print** function in the **File** pull down menu.

Print a General Report

A General Report allows you to print specific types of data for a set of samples. The Print Report dialog allows you to select a set of samples. It also allows you access to the Output Options dialog. This dialog allows you

to determine the data printed in your report. The following is a list of the data available. Select a data option by checking its check box. (Illuminants must be selected from list boxes.)

- **L*a*b* Data**
- **Reflectance Data**
- **Difference Mode**
- **Tags**
- **Notes**
- **Lot #**
- **Specular Included** (*for spherical instruments only*)
- **Specular Excluded** (*for spherical instruments only*)
- **Illuminants**

Steps:

To set up and print a general report, complete the following steps.

1. Click the **General…** function in the **Print Report** pop up window from the **File** menu. This opens the Print Report dialog.
2. If you want a different sample set, click the **Filter** arrow button. This opens the sample Filter dialog. To select a set of samples, refer to the Finding Samples sub-section. To create a new filter, refer to Section Ten—Advanced Software Features.
3. Click the **Options…** button. This opens the Output Options dialog.
4. Check the check boxes for the data you want included in your report.
5. In the **Available Illum/Obs** list box, highlight the illuminant you want to select. Click the **Include >** button to move it to the **Selected Illum/Obs** list box. Repeat this step for every illuminant/observer you want for your report. (To remove an illuminant/observer, simply highlight it in the **Selected Illum/Obs** list box and click the **Remove <** button.)
6. Click the **OK** button. This returns to the Print Report dialog.
7. Click the **Print…** button.

Print a Conformance Report

A Conformance Report prints absolute data or difference data with pass/fail indications for a set of samples. (Absolute data gives the values for the samples. Difference data gives the delta values between a sample and the standard.) It also allows you to print a header and a note on a cover

page. The Conformance Report dialog allows you to select a set of samples as well as enter your cover page header and note.

Steps:
To set up and print a conformance report, complete the following steps.

1. Click the **Conformance…** function in the **Print Report** pop up window from the **File** menu. This opens the Conformance Report dialog.
2. If you want a different sample set, click the **Filter** arrow button. This opens the sample Filter dialog. To select a set of samples, refer to the Finding Samples sub-section. To create a new filter, refer to Section Ten—Advanced Software Features.
3. Select either the **Absolute Mode** or **Difference Mode** radio button.
4. Enter your header in the **Page Header** entry field.
5. Enter your note in the **Cover Page Note** entry field.
6. Click the **Print** button.

Print a Complete Report

IMPORTANT: The "Complete Report" available with the software is a specific report designed by X-Rite, Incorporated for the "Master" series products. This report contains additional options not available in any other report.

NOTE: You *can not* export a Complete Report.

The Complete Report is printed through the Print Complete Report dialog. The Print Complete Report dialog allows you to select a set of samples, determine the options to print, and preview the report. The following is a list items in the Complete Report Options dialog. (This is the *only* report that contains these options.)

- **Tristimulus Data**
- **Reflectance Data**
- **Density Data**
- **Color Data**
- **Status Density Data**
- **Status**
- **Notes**
- **Tags**

- **Strength**
- **Metamerism**
- **Lot ID**
- **LabCh Data** - You may select either **CIELab** data or **Hunter** data.
- **CMC Data** - You may enter lightness and chroma values.
- **Difference Mode** - This check box indicates you want difference data. If not checked, the report contains absolute data.
- **Specular In** (Specular Included - *for spherical instruments only*)
- **Specular Ex** (Specular Excluded - *for spherical instruments only*)
- **Illuminant/Observers** - These list boxes allow you to select illuminant/observers for the data.
- **Metamerism** - You may select a primary illuminant/observer and a secondary illuminant/observer to compare metameric data.
- **Status Density Spectral** and **Spectral X** data.
- **OK** - This button accepts the print options and returns to the Print Complete Report dialog.
- **Use as Default** - This button uses the currently selected options as the default options that are selected when opening this dialog.
- **Close** - This button *does not* accept the print options and returns to the Print Complete Report dialog.
- **Help** - This button opens the Helpfile.

You may preview the Complete Report in the Print Preview dialog. This dialog contains the following viewing functions.

- **| <** - This button displays the first page of the report.
- **| >** - This button displays the last page of the report.
- **<** - This button displays the page previous to the current page.
- **>** - This button displays the page after the current page.
- **Zoom In/Zoom Out** - This button zooms in or out on the report.
- **Print** - This button prints the report.
- **Close** - This button closes the Print Preview dialog.

Steps:

To print a complete report, complete the following steps.

1. Click the **Complete…** function in the **Print Report** pop up menu from the **File** pull down menu. This opens the Print Complete Report dialog.
2. If you want a different sample set, click the **Filter** arrow button. This opens the sample Filter dialog. To select a set of samples, refer to the Finding Samples sub-section. To create a new filter, refer to Section Ten—Advanced Software Features.
3. Click the **Options…** button. This opens the Complete Report Options dialog.
4. Check the data check boxes for the data you want included in the report.
5. Select either the **CIELab** or **Hunter** radio button.
6. Enter your CMC values for lightness (**l**) and chroma (**c**) in the **l** and **c** entry fields.
7. If you want difference data, check the **Difference Mode** check box.
8. Check the **Specular** data check boxes you want in the report.
9. Select your primary metameric illuminant/observer from the **Primary Illum/Obs** drop down list.
10. Select your secondary metameric illuminant/observer from the **Secondary Illum/Obs** drop down list.
11. In the **Available Illum/Obs** list box, highlight the illuminant you want to select. Click the **Include >** button to move it to the **Selected Illum/Obs** list box. Repeat this step for every illuminant/observer you want for your report. (To remove an illuminant/observer, simply highlight it in the **Selected Illum/Obs** list box and click the **Remove <** button.)
12. Click the **OK** button. This returns to the Print Complete Report dialog.
13. Click the **Preview…** button to open the Print Preview dialog.
14. Use the Preview buttons to preview the report. If you want to print from the Print Preview dialog, click the **Print** button. This prints the Complete Report. Otherwise, click the **Close** button to return to the Print Complete Report dialog.
15. Click the **Print** button. This prints the Complete Report.

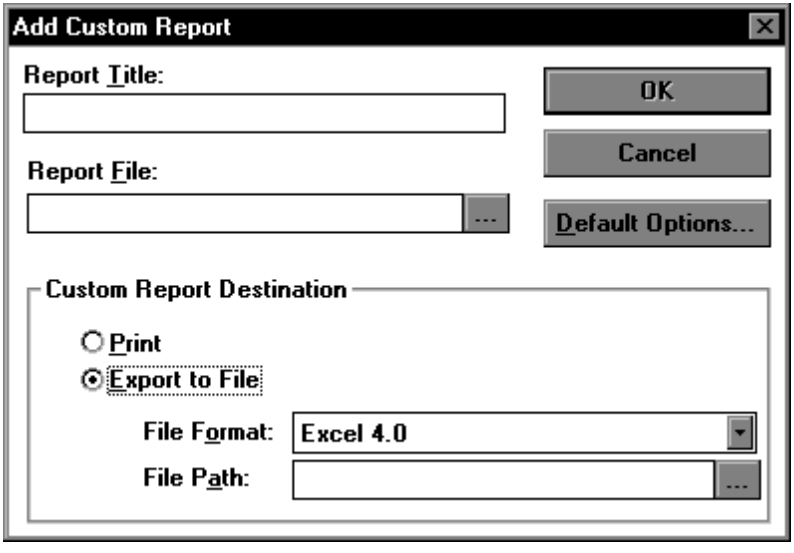
Create/Edit a Custom Report

The Custom Report function allows you to create and store a wide range of customized reports for easy access. You customize a report by assigning it specific characteristics. The Custom Reports dialog allows you to select an existing report to print, to delete a report, and to access the Add Custom Report and Edit Custom Report dialogs.

NOTE: Ink-Master provides four sample custom reports: **Color Report Export Example**, **Color Report Print Example**, **Statistics Export Example**, and **Statistics Print Example**.

The Add Custom Report dialog allows you to create a new report to add to the selection. The Edit Custom Report dialog allows you to edit an existing report. Custom report default options are assigned in the Custom Report Options dialog. The following is a list of the default options available.

- **LabCh Data** - You may select either **CIELab** data or **Hunter** data.
- **CMC Data** - You may enter lightness and chroma values.
- **Difference Mode** - This check box indicates you want difference data. If not checked, the report contains absolute data.
- **Illuminant/Observers** - These list boxes allow you to select illuminant/observers for the data.
- **Metamerism** - You may select a primary illuminant/observer and a secondary illuminant/observer to compare metameric data.
- **OK** - This button accepts the print options.
- **Close** - This button *does not* accept the print options.


Add Custom Report
Report Title:
OK
Cancel
Report File:
...
Default Options...
Custom Report Destination
Print
Export to File
File Format:
Excel 4.0
File Path:
...

Steps:
To add or edit a custom report, complete the following steps.

1. Click the **Custom…** function in the **Print Reports** pop up menu from the **File** pull down menu. This opens the Custom Reports dialog.
2. Choose to add a new custom report or edit an existing report.
   - Click the **Add…** button. This opens the Add Custom Report dialog.
   - In the **Custom Reports** list box, highlight the report you want to edit. Click the **Edit…** button. This opens the Edit Custom Report.
3. Enter or edit the name of the report in the **Report Title** entry field.
4. Enter or edit the filename and path of the report in the **Report Path** entry line. (Click the **…** button to browse for the path. This opens a standard Windows Open dialog. Refer to your Windows documentation for more information.) You *must* select the same directory path as the database you are using.
5. Choose to print or export the report.
   - To print, select the **Print** radio button.
   - To export, select the **Export** radio button. Select the file format from the **File Format** drop down list. Enter the filename and path of the export file in the **File Path** entry line. (Click the **…** button to browse for the path. This opens a standard Windows Open dialog. Refer to your Windows documentation for more information.)
6. Click the **Default Options…** button. This opens the Custom Report Calculation Methods dialog.
7. Select either the **CIELab** or **Hunter** radio button.
8. Enter your CMC values for lightness (**l**) and chroma (**c**) in the **l** and **c** entry fields.
9. If you want difference data, check the **Difference Mode** check box.
10. Select your primary metameric illuminant/observer from the **Primary Illum/Obs** drop down list.
11. Select your secondary metameric illuminant/observer from the **Secondary Illum/Obs** drop down list.
12. In the **Available Illum/Obs** list box, highlight the illuminant you want to select. Click the **Include >** button to move it to the **Selected Illum/Obs** list box. Repeat this step for every

illuminant/observer you want for your report. (To remove an illuminant/observer, simply highlight it in the **Selected Illum/Obs** list box and click the **Remove <** button.)

13. Click the **OK** button. This returns to the Add Custom Report or Edit Custom Report dialog.
14. Click the **OK** button. This returns to the Custom Reports dialog.

Steps:

To delete a custom report, complete the following steps.

1. Click the **Custom…** function in the **Print Report** pop up menu from the **File** pull down menu. This opens the Custom Reports dialog.
2. Select the report you want to delete from the **Custom Reports** list box.
3. Click the **Delete…** button. A confirmation dialog appears.
4. Click the **Yes** button to delete the custom report. Click the **No** button if you do not want to delete the custom report.

Print/Export a Custom Report

A Custom Report may be printed or exported depending on how the custom report is set up. You can only determine whether a report is printed or exported in the Add Custom Report or Edit Custom Report dialog. Refer to the Create/Edit a Custom Report sub-section. You may select specific data options before printing or exporting a report. These options include all of the *default* options discussed the Create/Edit a Custom Report sub-section, with the *addition* of two types of data: the **Strength** wavelength, and the Status Density **Spectral** and **Spectral X** wavelengths.

When *printing* a custom report, you may preview it in the Print Preview dialog. This dialog contains the following viewing functions.

- **| <** - This button displays the first page of the report.
- **| >** - This button displays the last page of the report.
- **<** - This button displays the page previous to the current page.
- **>** - This button displays the page after the current page.
- **Zoom In/Zoom Out** - This button zooms in or out on the report.
- **Print** - This button prints the report.
- **Close** - This button closes the Print Preview dialog.

Steps:
To print or export a custom report, complete the following steps.

1. Click the **Custom…** function in the **Print Report** pop up window from the **File** menu. This opens the Custom Report dialog.
2. In the **Custom Reports** list box, highlight the report you want to print or export.
3. Click the **OK** button. This opens either the Print Custom Report or Export Custom Report dialog.
4. If you want a different sample set, click the **Filter** arrow button. This opens the sample Filter dialog. To select a set of samples, refer to the Finding Samples sub-section. To create a new filter, refer to Section Ten—Advanced Software Features.
5. Click the **Options…** button. This opens the Custom Report Calculation Methods dialog.
6. Edit any of the options.
7. Click the **OK** button. This returns to either the Print Custom Report or Export Custom Report dialog.
8. *For printing only*, click the **Preview…** button to preview the report printout.
9. To print the report, click the **Print** button. To export the report, click the **Export** button.

USING THE NOTE EDITOR

The Note Editor allows you to enter and attach notes to items. If an item can have a note attached to it, it provides one of two ways to open the Note Editor, a **Note…** button or a **Note** arrow. The Note Editor contains a large entry field to enter a note and a menu bar with two menus, **File** and **Edit**.

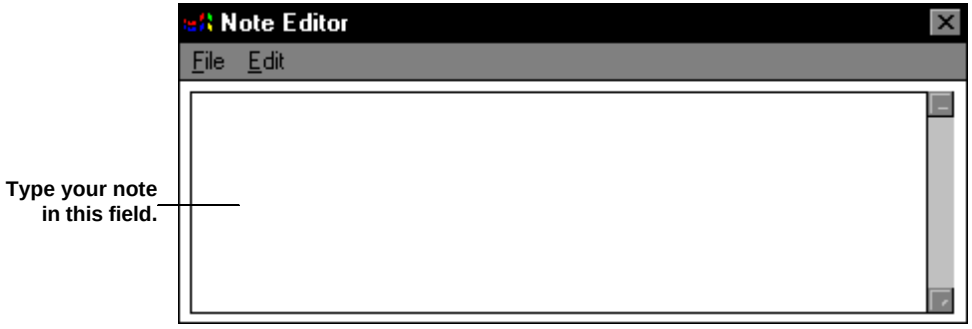
The **File** menu contains the following three functions.

- **Save and Exit** - This function saves the note and exits the Note Editor.
- **Print** - This function prints the note to your standard default printer.
- **Exit** - This function exits the Note Editor without saving any changes to the note.

The **Edit** menu contains the following six functions.

- **Undo** - This function will “un-do” the last change you made to the note.

- **Cut** - This function deletes the highlighted selection of text and copies it to the clipboard.
- **Copy** - This function copies the highlighted selection of text to the clipboard.
- **Paste** - This function pastes the clipboard items into the note at the insertion point (blinking cursor).
- **Clear** - This function deletes the highlighted selection of text *without* copying it to the clipboard.
- **Select All** - This function selects the entire note.

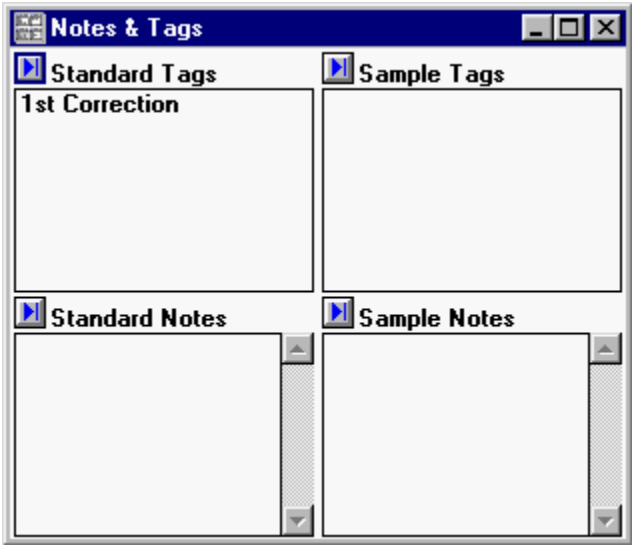


Steps:
To create, edit, or delete a note in the Note Editor, complete the following steps.

1. Click the **Note** button or arrow button. This opens the Note Editor.
2. Click in the entry field to enter or edit the note in the entry field.
3. Use the **Edit** menu items to make any necessary changes. (To delete a note, simply delete all the text and save the note.)
4. Select the **Save and Exit** function in the **File** menu to save a new note or to save any changes to an existing note.

ADDING NOTES & TAGS TO A SAMPLE

Ink-Master helps you organize samples by allowing you to add notes and tags to a sample. Adding notes and tags to a sample is done in the Notes & Tags view window.



Steps:
To add notes and tags to a sample, complete the following steps.

1. In the Controls window, click the **Standard** arrow button and select the standard you want to display. Refer to the Finding a Standard sub-section.
2. Select the **Notes & Tags** item in the **View** pull down menu. This opens the Notes & Tags view window.
3. Use the **Sample** scroll bar in the Controls window to select a sample.
4. In the Notes & Tags view window, click the **Sample Notes** arrow button.
5. Enter or edit the sample's note in the Note Editor. Refer to the Using the Note Editor sub-section. When complete, the note appears in the **Sample Notes** display area.
6. In the Notes & Tags view window, click the **Sample Tags** arrow button. This opens the Select Tags dialog.
7. Highlight the tag you want to select in the **Available Tags** list box and click the **Include >** button to move it to the **Selected**

Tags list box. (To remove an ink from the **Selected Tags** list box, highlight it and click the **Remove <** button.)

8. Repeat step 7 for each tag you want to attach. To create a new tag, refer to Section Ten—Advanced Software Features.
9. Repeat steps 3 through 8 for each sample in the current sample set.

ACCEPTING OR REJECTING A SAMPLE

Ink-Master allows you to record the visual assessment results of you or your customer for every sample. Three determinations can be made: **accept**, **reject**, or **undetermined**. These are assigned in the Controls window. Recording this information enables visual tolerance editing. Refer to Section Ten—Advanced Software Features.

NOTE: You may also choose to let Ink-Master automatically assign acceptability to samples by selecting the **Auto Assign** item in the **Controls** View Specific pull down menu. Refer to Section Nine—Viewing Your Data for more information on View Specific menus.

Steps:

To assign acceptability to a sample, complete the following steps.

1. In the Controls window, click the **Standard** arrow button and select the standard you want to display. Refer to the Finding a Standard sub-section.
2. Use the **Sample** scroll bar in the Controls window to select a sample.
3. Determine the acceptability of the sample by viewing the data, and click the appropriate radio button, **Accept**, **Reject**, or **Undetermined**.
4. Repeat steps 2 and 3 for each sample in the current sample set.

FINDING A STANDARD

There are five ways to find a standard **1)** measure and find a standard **2)** search the database with a filter **3)** search for a standard by its name **4)** search for a standard by Lot ID **5)** or measure a different sample.

Measuring & Finding a Standard

Ink-Master allows you to measure in a color and find an existing standard that is the closest match.

Steps:
To measure in a color to find a standard, complete the following steps.

1. Select the **Find Standard…** function from the **Database** menu, or select a **Standards** arrow button. This opens the Find Standard dialog.
2. Select the **Measure & Find…** button. The software prompts you for a measurement.
3. Take a measurement of the target standard color. The closest match to the target is automatically displayed.

Searching with a Standard Filter

A Standard Filter allows you to find and select a standard that matches the parameters of the filter's search criteria. You can select a standard filter in the Standard Search Definition dialog. Refer to Section Ten—Advanced Software Features for creating, editing, or deleting standard filters.

Steps:
To search for and select a standard with a Standard Filter, complete the following steps.

1. Open the Standard Search Definition dialog by following either of these steps.
   - Select the **Find Standard…** function from the **Database** menu, or select a **Standards** arrow button. This opens the Find Standard dialog. Then select the **Search…** button. This opens the Standard Search Definition dialog.
   - Select the **Standard Filters…** function in the **Edit Filters** pop up window from the **Database** menu. This opens the Standard Search Definition dialog.
2. Highlight the filter you want to select.
3. Click the **Search…** button. The standards that fit the parameters of the filter appear in the Search Results dialog. The **Transfer…** button transfers all the standards out. Refer to Section Eight—Managing Your Data.
4. Highlight the standard you want to select.
5. Click the **OK** button.

Finding a Standard by Name

Ink-Master allows you to search for the standard by its name. You can either enter the entire name or the first portion of the standard's name

followed by an asterisk (for example, **White*** searches for all standards beginning with “White”). You can also search for a standard for one customer or for all the customers.

Steps:
To find a standard by its name, complete the following steps.

1. Select the **Find Standard by Name…** function from the **Database** menu. This opens the Find Standard by Name dialog.
2. Enter the name in the **Name** entry field.
3. If desired, check the **Across Customers** to search across all the customers.
4. Click the **Find…** button. The standard that matches the name is automatically displayed.

Finding a Standard by Lot ID

Ink-Master allows you to search for a standard by a Lot ID. If you do not enter a Lot ID, Ink-Master will find *all* the standards *without* Lot IDs. Refer to Section Ten—Advanced Software Features for more information on Lot ID’s. *You must search for the Lot ID across all standards.*

Steps:
To find a standard by Lot ID, complete the following steps.

1. Select the **Find Lot ID…** function from the **Database** menu. This opens the Find Lot ID dialog.
2. Enter the Lot ID in the **Lot ID** entry field.
3. Check the **Across Standards** to search across all the standards.
4. Click the **Find…** button. This opens the Find Lot ID Results dialog which displays the standards that match the Lot ID.
5. Highlight the desired standard.
6. Click the **Select** button.

Measuring a Different Sample

If you measure a sample that is *significantly* different from the current standard, Ink-Master prompts you to find a new standard. If you choose to do so, the software searches for standards that closely match the sample you measured.

Steps:
To find a standard that matches your measured sample, complete the following steps.

1. Select **Measure Trial…** function from the **Instrument** menu. This opens the Measure Trial dialog for the current standard.
2. Measure your sample. Refer to the Taking a Measurement sub-section.
3. If Ink-Master finds a considerable color difference, the Create Sample: Warning dialog opens and asks if you want to find a new standard.
4. Click the **Yes** button. This opens the Search Results dialog which lists the standards that are the closest matches to your sample.
5. Highlight the desired standard. The **Least Squares** value represents how close the highlighted standard's spectral curve is to the measured sample. The lower the number, the closer the match.
6. If you want to transfer the standard out, click the **Transfer…** button. Refer to Section Eight—Managing Your Data.
7. To select the desired standard, click the **OK** button. The selected standard appears in the Controls window.

FINDING SAMPLES

There are two ways to find a set of samples: by using a sample filter or by searching by its Lot ID.

Using a Sample Filter

A Sample Filter allows you to select a set of samples (trials and matches) that share the common parameters of the filter's search criteria. Refer to Section Ten—Advanced Software Features for creating, editing, or deleting sample filters.

Steps:
To select a Sample Filter, complete the following steps.

1. Select the **Sample Filters…** function in the **Edit Filters** pop up window from the **Database** menu, *or* click the **Filter** arrow button in the Controls window. This opens the Filters dialog.
2. Highlight the filter you want to select.

3. Click the **Select** button. The samples that fit the parameters of the filter are automatically displayed.

Finding Samples by Lot ID

Ink-Master allows you to search for samples by a Lot ID. If you do not enter a Lot ID, Ink-Master will find *all* the samples *without* Lot IDs. You can also search for samples for one standard or for all the standards. Refer to Section Ten—Advanced Software Features for more information on Lot ID's.

Steps:

To find samples by Lot ID, complete the following steps.

1. Select the **Find Lot ID…** function from the **Database** menu. This opens the Find Lot ID dialog.
2. Enter the Lot ID in the **Lot ID** entry field.
3. If desired, check the **Across Standards** to search across all the standards.
4. Click the **Find…** button. The samples that match the Lot ID are automatically displayed.

SECTION EIGHT

Managing Your Data

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Uploading Data 8-13
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Transferring Data.....8-18
Backing Up Your Database 8-22
Restoring Your Database 8-23

Section Eight provides information about the functions that allow you to properly manage your data and your database—copying, pasting, downloading, uploading, exporting, transferring, backing up, and restoring. These functions seem similar, but each one performs a specific task for managing your data.

COPYING & PASTING DATA

Ink-Master allows you to copy and paste two types of data: standards and samples. The data copied to the clipboard is similar for standards and samples (name, reflectance data, date/time, notes/tags, etc.). This allows the data to be pasted back into Ink-Master as either a standard or a sample. Data can also be pasted into spreadsheets or word processors as well as other X-Rite applications that use the same geometry (spherical to spherical or 0°/45° to 0°/45°).

Copying Standards & Samples

Standards and samples are copied in the same manner. When the copy function is selected, the data is moved to the clipboard. Tolerance data does not copy when a standard is copied. Samples can be copied only one at a time.

Steps:

To copy a standard or a sample, complete the following steps.

1. Select the **Copy…** function from the **Edit** menu. This opens the Select Data Type dialog.
2. Click either the **Standard** radio button or the **Sample** radio button.
3. Click the **OK** button. The data is copied to the clipboard.

Pasting Standards

When pasting data as a standard, you may add the data in the clipboard as a new standard, or you may replace/edit the current standard data with the data in the clipboard. If you choose create a new standard, you need to enter the standard name and select the customer. If you choose to replace/edit the current standard, you can either overwrite the current standard or save it under an alternate description. For more information about alternate standards, refer to Section Ten—Advanced Software Features.

Steps:

To paste data as a standard, complete the following steps.

1. Click the **Paste…** button. This opens the Select Data Type dialog.
2. Click the **Standard** radio button.
3. Click the **OK** button. This opens the Select Paste Operation dialog.

4. To create a new standard, follow these steps.
   - Click the **Create new standard** radio button.
   - Click the **OK** button. This opens the New Standard Name dialog.
   - Select the desired customer from the **Customer** drop down list.
   - Enter the new standard name in the **Name** entry field.
   - Click the **OK** button.
5. To replace or edit the current standard, follow these steps.
   - Click the **Replace current standard** radio button.
   - Click the **OK** button. This opens the Standard Description dialog.
   - To save the new standard under an alternate description, click the **Yes** button and enter the new standard description in the Standard Description dialog. Click **OK**. For more information about alternate standard descriptions, refer to Section Ten—Advanced Software Features.
   - To overwrite the existing standard, click the **No** button.

Pasting Samples

When pasting data as a sample, the sample is placed in the proper chronological order of the current sample set.

Steps:

To paste data as a sample, complete the following steps.

1. Click the **Paste…** button. This opens the Select Data Type dialog.
2. Click the **Sample** radio button. This opens the Select Formula dialog.
3. Select the desired formula with the **Formula** scroll bar. To edit the formula, click the **Formula** arrow button and refer to Section Ten—Advanced Software Features.
4. Click the **OK** button.

DOWNLOADING DATA

Downloading is the process of transferring data to the instrument. You may either download Group Names or Standards. This function aids in remote use of your instrument by setting the instrument into the measurement storage mode for group names or standards. The Group Names download function provides you with a method of organizing the

remotely measured samples into groups. The Standards download function provides a method of referencing samples measured against your existing standards. The instrument can automatically detect the nearest standard and can provide immediate pass/fail information.

Below is a chart of the *maximum* downloads per instrument.

Instrument:	938	968	978	SP68	SP78	SP88
Maximum Group Names:	20	20	20	20	20	20
Maximum Standards:	24	24	*none*	50	*none*	200

Download Group Names

Group Names are entered into entry fields and downloaded to the instrument.

Steps:

To download group names, complete the following steps.

1. Be sure your instrument is properly connected to the computer. If unsure, refer to Section Two—Instrument Setup & Calibration.
2. Select the **Group Names…** function in the **Download** pop up menu from the **Instrument** pull down menu. This opens the Download Group Names dialog.
3. Enter the group names (one name per entry field). A maximum of 16 characters is allowed per name.
4. When all names are entered, click the **Download** button.
5. When the successful download message appears, disconnect your instrument from the computer and take your measurements.

Download Standards

Ink-Master allows you to select standards to download to the instrument.

Steps:

To download standards, complete the following steps.

1. Be sure your instrument is properly connected to the computer. If unsure, refer to Section Two—Instrument Setup & Calibration.
2. Select the **Standards…** function in the **Download** pop up menu from the **Instrument** pull down menu. This opens the Download Standards dialog.

3. In the **Customer** list box, highlight the appropriate customer.
4. In the **Standards** list box, highlight the standard you want to download.
5. Click the **Include** button to move the standard to the **Marked for Download** list box. (To remove a standard from the **Marked for Download** list box, highlight it in this list box and click the **Remove** button.) Repeat steps 4 and 5 for each standard you want to download.
6. When all desired standards are marked for download, click the **Download** button.
7. When the successful download message appears, disconnect your instrument from the computer and take your measurements.

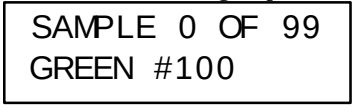
NOTE: When a bar code reader (BCR) is used in conjunction with a sphere instrument, the first scanned bar code can be assigned as the sample "Lot ID."

Instrument Key Operation

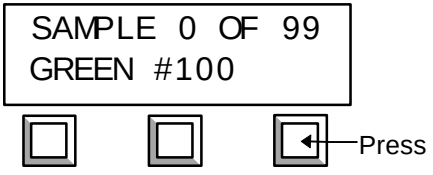
The procedures described on the following pages illustrate the selection techniques and stored sample deletion procedures for 0°/45° and sphere instruments, using group name storage. The 0°/45° instrument will be shown first followed by the sphere instrument. It also shows you how to view downloaded standards

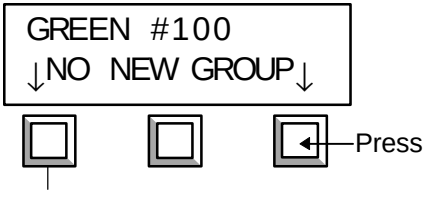
0°/45° Key Operation (Using Group Name Storage)

1. The first group name will be displayed on the instrument. Measure the samples for the displayed group, or advance to Step 2 to select a different group name.

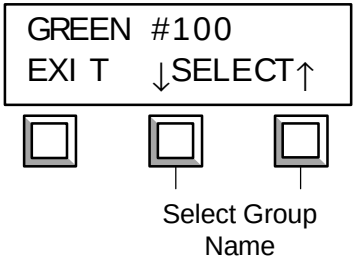


2. To select a different group name, press the *"Right-hand"* key on the instrument twice.

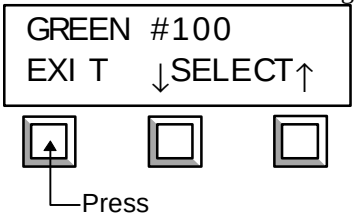




3. Press the *"Down arrow"* key or *"Up arrow"* key to select group name.



4. After the desired group name is displayed, press the *"Exit"* key to set the instrument back in storage mode.



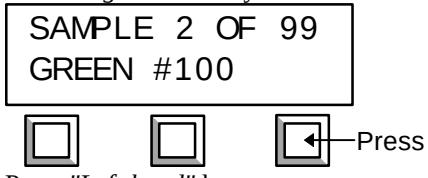
5. Measure samples.

0°/45° Sample Deletion (Using Group Name Storage)

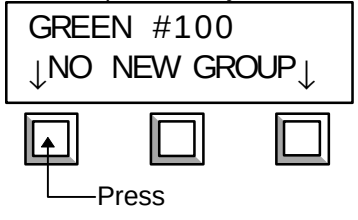
The spectrophotometer will allow measurements to be deleted from the stored memory in the instrument before data is uploaded to Ink-Master. This option is useful if a measurement is inadvertently taken or you want to

remove a sample measurement. There are two methods to remove stored samples from the instrument: **Delete Last** or **Clear All**. Delete Last allows the *last* measurement taken to be deleted. Clear All will remove *all* stored measurements from the instrument.

1. Press *"Right-hand"* key.

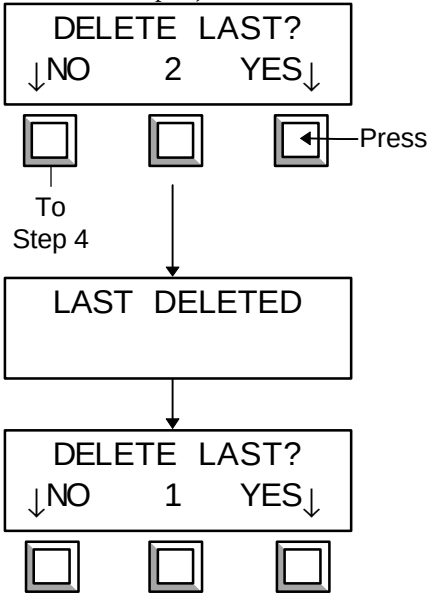


2. Press *"Left-hand"* key.



Delete Last Measurement

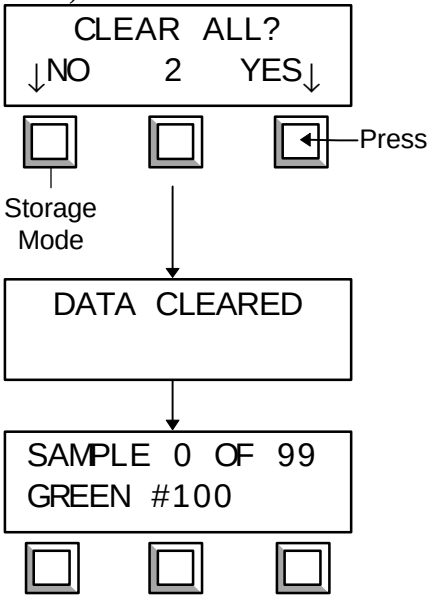
3. Press *"Right-hand"* key to delete last measurement taken.
   Note: This step can be repeated to continually delete the last measurement. (If *"NO"* is selected, press *"Left-hand"* key and advance to step 4.)



NOTE: To get to the Delete Last menu when standards are downloaded, press the *"Middle"* key and "*Left-hand"* key simultaneously. Then press the *"Right-hand"* key. Measurements can only be deleted in order (last to first), not by group name. The instrument will beep twice and display **"LAST DELETED START OF GROUP"** after the last sample of a group is deleted.

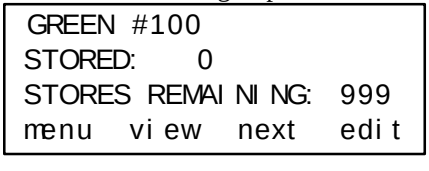
Clear All Data

4. Press *"Right-hand"* key to clear all stored measurement data taken. (If *"NO"*, press *"Left-hand"* key to return to normal storage mode.)

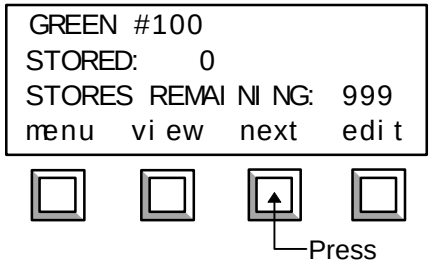


Sphere Key Operation (Using Group Name Storage)

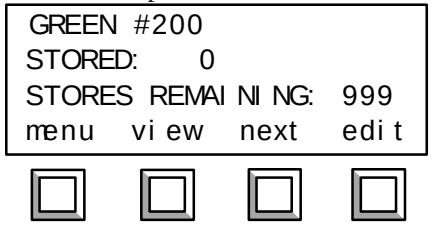
1. The first group name will be displayed on the instrument. Measure the samples for the displayed group, or advance to Step 2 to select a different group name.



2. To select a different group name, press the **[next]** key on the instrument.



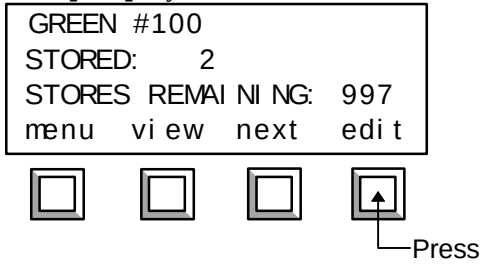
3. Measure samples.



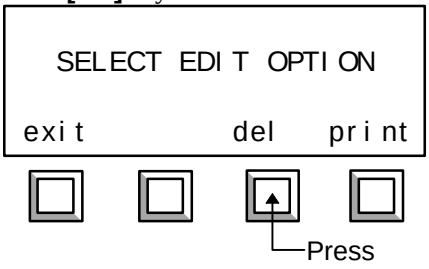
Sphere Sample Deletion (Using Group Name Storage)

The spectrophotometer will allow measurements to be deleted from the stored memory in the instrument before data is uploaded to Ink-Master. This option is useful if a measurement is inadvertently taken or you want to remove a sample measurement. There are two methods to remove stored samples from the instrument: **Delete Last** or **Delete All**. Delete Last allows the *last* measurement taken to be deleted. Delete All will remove *all* stored measurements from the instrument.

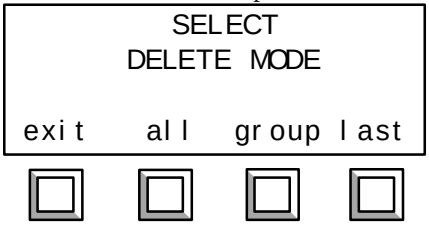
1. Press **[edit]** key.



2. Press **[del]** key.



3. Press **[last]** key to delete last measurement taken. Press **[all]** key to delete all stored samples in the instrument.



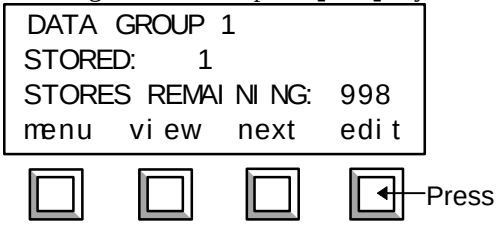
NOTE: Samples cannot be deleted by group, all samples are stored in the same group. Refer to the instrument's Operation Manual for a more detailed explanation on deletion if required.

Viewing Downloaded Standard Data (*Sphere Instruments only*)

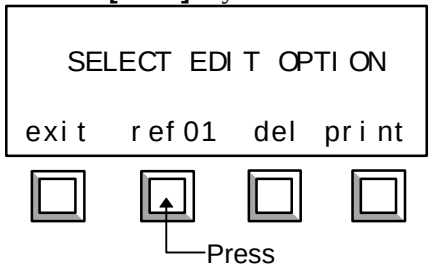
Sphere instruments allow you to view the downloaded standard name and data. This feature is desirable if you want to verify the standard used in a sample comparison.

To view standard name:

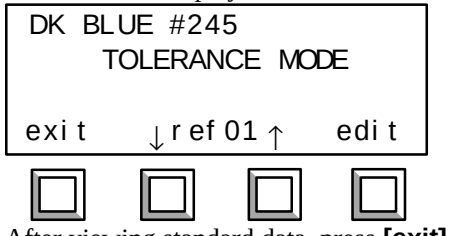
1. At storage menu level, press **[edit]** key.



2. Press the **[ref##]** key.



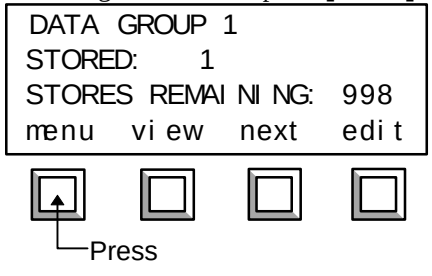
The standard name used (20 characters max.) for the sample measured will display.



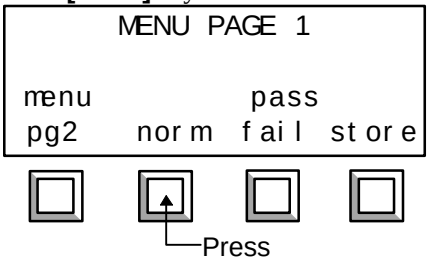
3. After viewing standard data, press **[exit]** to return to storage mode.

To view standard data:

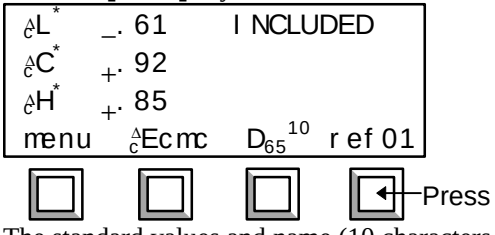
1. At storage menu level, press **[menu]** key.



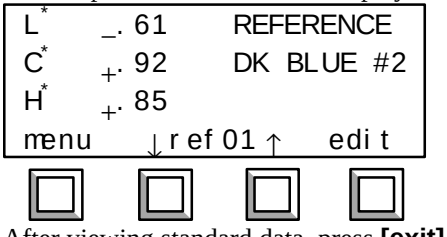
2. Press **[norm]** key in MENU PAGE 1.



3. Press the **[ref##]** key.



The standard values and name (10 characters max.) used for the last sample measurement will displayed.



4. After viewing standard data, press **[exit]**, **[menu]**, and **[store]** keys to return to storage mode.

UPLOADING DATA

Uploading is the process of transferring data from the instrument to the Ink-Master software. This function allows you to retrieve stored data that was remotely measured. The upload function is dependent upon the type of download function that was used to set the instrument into measurement storage mode. You may upload either Group Names or Standards.

Upload Group Names

If you downloaded with the Group Names function, the Upload Group Names dialog automatically opens upon activating this function. Each group of measurements is then individually uploaded into the selected standard. Tags can be attached to the uploaded samples if required.

NOTE: Grayed groups can not be uploaded. A group is grayed if no stored data exists or if the group has already been uploaded.

Steps:
To upload group names, complete the following steps.

1. Connect the instrument to the computer. Refer to Section Two—Instrument Setup & Calibration.
2. Select the **Upload…** function from the **Instrument** menu. This opens the Upload Group Names dialog.
3. In the **Select Group to Upload** area, select the group radio button for the group you want to upload.
4. Click the **Select Standard** button. This opens the Find Standard dialog.
5. Find and select the desired standard. Refer to Section Seven—Basic Techniques.
6. Click the **Sample Tag** arrow button to attach tags to the samples in the selected group. Refer to Section Ten—Advanced Software Features.
7. Click the **Upload** button.
8. Repeat steps 3 through 7 for each group you want to upload.

Upload Standards

If you downloaded with the Standards function, the Upload Standards dialog automatically opens upon activating this function. Ink-Master allows you to select standards to upload. Once a standard is uploaded, Ink-Master automatically selects the closest standard match from the database. The last formula (trial or match) in the standard is then displayed in the Select Formula dialog. If more than one match formula exists in the standard, you need to select the correct formula.

NOTE: When a bar code reader (BCR) is used in conjunction with a sphere instrument, the first scanned bar code can be assigned as the sample "Lot ID."

Steps:
To upload standards, complete the following steps.

1. Connect the instrument to the computer. Refer to Section Two—Instrument Setup & Calibration.

2. Select the **Upload…** function from the **Instrument** menu. This opens the Upload Standards dialog.
3. *For sphere instruments with BCR only*, check the **Assign Tag#1 as Lot ID** check box if you want the first scanned tag to be used as the sample ID during upload.
4. Click the **Upload** button. This opens the Select Formula dialog.
5. If the formula displayed is not the correct formula, select the correct formula.
   - Use the **Formula** scroll bar to select the correct formula.
   - If you need to edit the formula, click the **Formula** arrow button. This opens the Edit Trial Formula dialog. Edit the formula. Refer to Section Ten—Advanced Software Features.
   - Click the **OK** button. This returns to the Upload Standards dialog.
6. Repeat steps 4 and 5 for each standard to upload.

EXPORTING STANDARDS & INKS

Ink-Master allows you to export standard or ink data to use in a spreadsheet program such as Microsoft® Excel.

Export a Standard

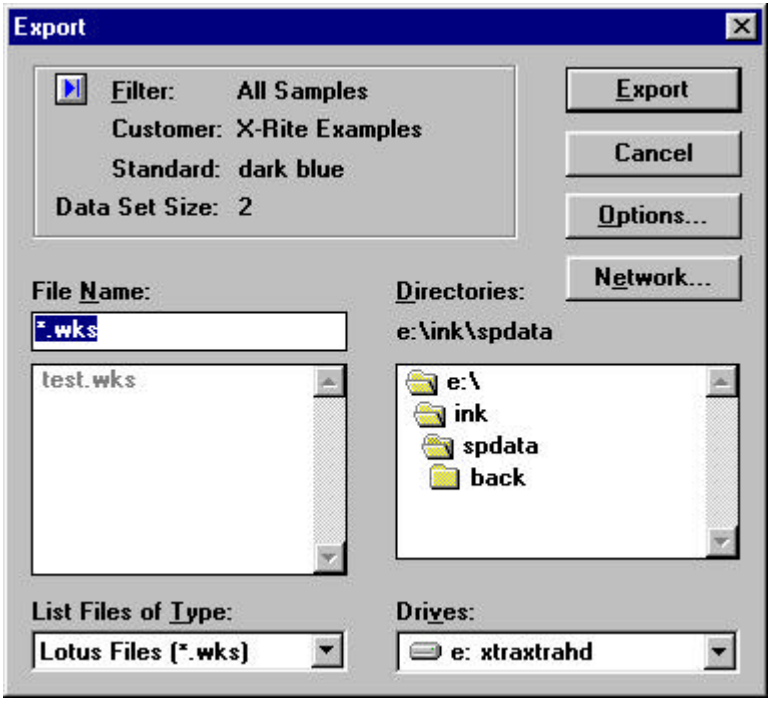
When exporting a standard, you must determine the location of the export file and the type of data included in the export file.

Ink-Master allows you to select output options for the data in the Output Options dialog. The following is a list of the output options available. Select an output option by checking its check box. (Illuminants must be selected from list boxes.)

- **L*a*b* Data** - When checked, the export file contains L*a*b* data.
- **Reflectance Data** - When checked, the export file contains reflectance data.
- **Difference Mode** - When checked, the data reflects difference values. When un-checked, the data reflects absolute values. (Absolute data gives the values for the samples. Difference data gives the delta values between a sample and the standard.)
- **Lot # -** When checked, the export file contains the Lot ID.
- **Specular Included** - *For spherical instruments only*, the export file contains specular included data.
- **Specular Excluded** - *For spherical instruments only*, the export file contains specular excluded data.

- **Illuminant/Observer** - A set of data exports for each selected illuminant/observer pair.

NOTE: To use a file name extension other than **.wks**, you must specify the extension in the Export dialog's **File Name** entry field.



Steps:
To export a standard, complete the following steps.

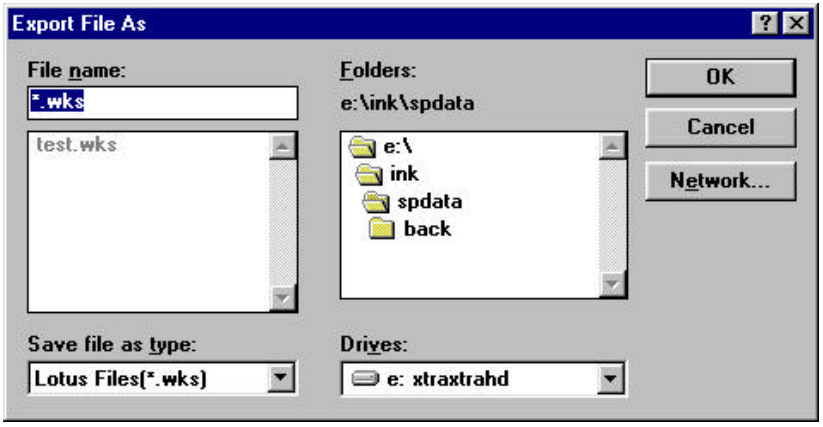
1. In the Controls window, click the **Standard** arrow button. This opens the Find Standard dialog.
2. Find and select the standard you want to export. Refer to Section Seven—Basic Techniques.
3. Once the desired standard is selected, select the **Standards…** function in the **Export** pop up menu from the **File** menu. This opens the Export dialog.
4. Click the **Filter** arrow button. This opens the sample Filters dialog.

5. Find and select the sample set you want to export with your standard. Refer to Section Seven—Basic Techniques.
6. Click the **Options** button. This opens the Output Options dialog.
7. Check all the desired data check boxes.
8. Highlight the illuminant/observer you want to select in the **Available Illum/Obs** list box and click the **Include >** button to move it to the **Selected Illum/Obs** list box. (To remove an ink from the **Selected Illum/Obs** list box, highlight it and click the **Remove <** button.)
9. Repeat step 8 for each illuminant/observer pair you want in your export file.
10. Once all the options are selected, click the **OK** button. This returns to the Export dialog.
11. Determine the location of your export file.
    - If you need to map to a network drive, click the **Network** button and map the network drive. Refer to your Windows documentation for more information.
    - Select the drive from the **Drives** drop down list.
    - Select the directory in the **Directories** list box.
    - Select the file name extension from the **List Files of Type** drop down list.
    - Enter the file name in the **File Name** entry field.
12. Click the **Export** button.

Export an Ink

When exporting an ink, you must determine the location of the export file.

NOTE: To use a file name extension other than **.wks**, you must specify the extension in the Export Ink dialog's **File Name** entry field.



Steps:
To export an ink, complete the following steps.

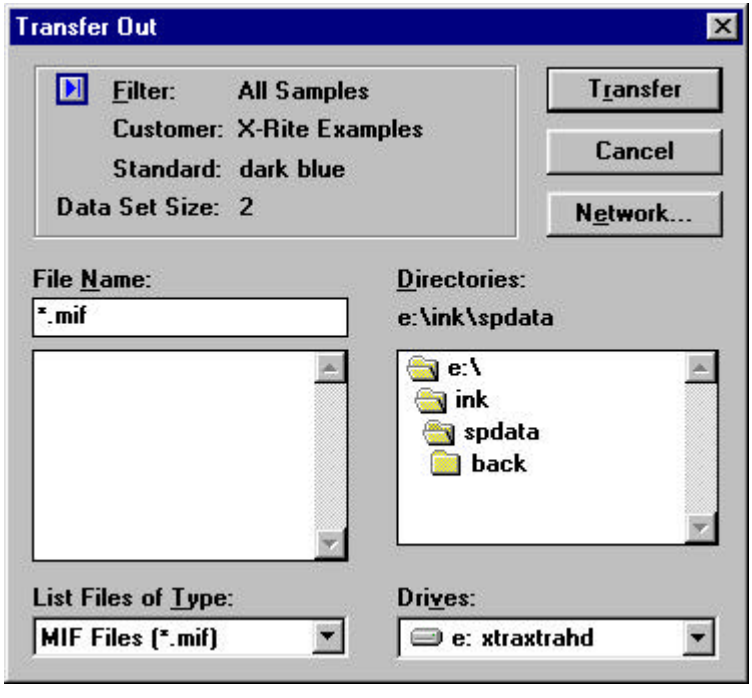
1. Select the **Inks…** function in the **Export** pop up menu from the **File** menu. This opens the Export Ink dialog.
2. In the **Calibration Sets** list box, highlight the calibration set that contains the ink you want to export. This lists all the inks for the calibration set in the **Inks** list box.
3. In the **Inks** list box, highlight the ink you want to export.
4. Click the **Export…** button. This opens the Export File As dialog.
5. Determine the location of your export file.
   - If you need to map to a network drive, click the **Network** button and map the network drive. Refer to your Windows documentation for more information.
   - Select the drive from the **Drives** drop down list.
   - Select the directory in the **Directories** list box.
   - Select the file name extension from the **List Files of Type** drop down list.
   - Enter the file name in the **File Name** entry field.
   - Click the **OK** button. The ink is exported.

TRANFERRING DATA

Ink-Master allows you to transfer standard or calibration set data in and out of the software so that you can use the data in conjunction with X-Rite's QA-Master software.

Transfer Out a Standard

When transferring out a standard, you must determine the location of the transfer file. You can use one of two different file name extensions: **.mif** (for X-Rite applications) or **.txt** (ASCII text file).



Steps:

To transfer out a standard, complete the following steps.

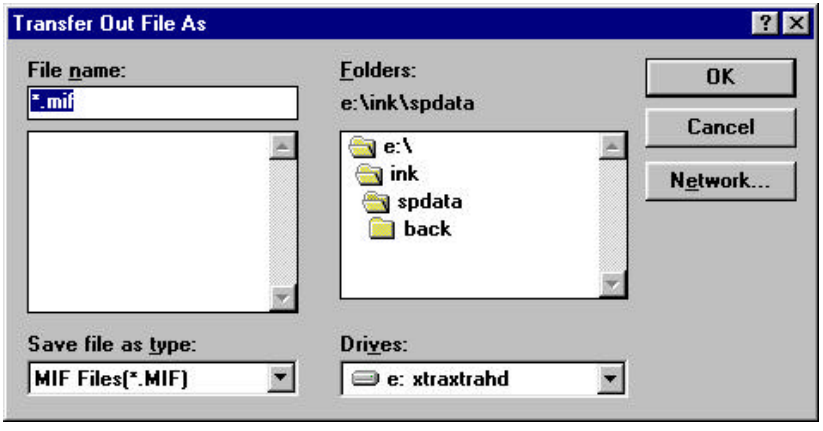
1. In the Controls window, click the **Standard** arrow button. This opens the Find Standard dialog.
2. Find and select the standard you want to export. Refer to Section Seven—Basic Techniques.
3. Once the desired standard is selected, select the **Standards…** function in the **Transfer Out** pop up menu from the **File** menu. This opens the Transfer Out dialog.
4. Click the **Filter** arrow button. This opens the sample Filters dialog.
5. Find and select the sample set you want to transfer out with your standard. Refer to Section Seven—Basic Techniques.

6. If you need to map to a network drive, click the **Network** button and map the network drive. Refer to your Windows documentation for more information.
7. Select the drive from the **Drives** drop down list.
8. Select the directory in the **Directories** list box.
9. Select the file name extension from the **List Files of Type** drop down list.
10. Enter the file name in the **File Name** entry field.
11. Click the **Transfer** button.

Transfer Out a Calibration Set

When transferring out a calibration set, you must determine the location of the transfer file.

NOTE: A calibration set is transferred out as a **.mif** file *only*.



Steps:

To transfer out a calibration set, complete the following steps.

1. Select the **Calibration Set…** function in the **Transfer Out** pop up menu from the **File** menu. This opens the Transfer Calibration Set dialog.
2. In the **Calibration Sets** list box, highlight the calibration set that you want to transfer out.
3. Click the **Transfer…** button. This opens the Transfer Out File As dialog.

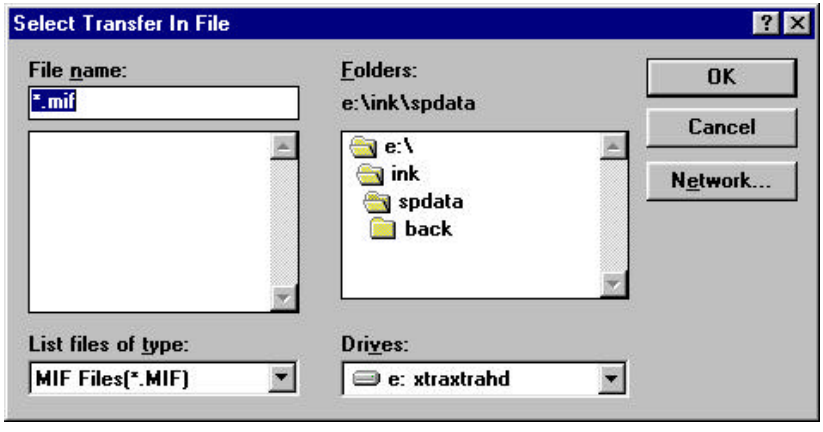
4. If you need to map to a network drive, click the **Network** button and map the network drive. Refer to your Windows documentation for more information.
5. Select the drive from the **Drives** drop down list.
6. Select the directory in the **Directories** list box.
7. Enter the file name in the **File Name** entry field.
8. Click the **OK** button.

Transfer In a Standard or Calibration Set

Ink-Master allows you to transfer in standards and calibration sets. Only **.mif** files can be transferred into Ink-Master.

Update Prompts

If transferring in a standard or a calibration set with data that already exists in your database, Ink-Master prompts you to determine whether or not to update the data. In the prompt dialog, **Yes** updates the data with the transfer data; **Yes to All** updates all data while transferring in *without* any further prompts; **No** does not update the data while transferring in; **No to All** does not update any of the data while transferring in *without* any further prompts. **Cancel** cancels the transfer in process.



Steps:

To transfer in a standard or a calibration set, complete the following steps.

1. Select the **Transfer In…** function from the **File** menu. This opens the Select Transfer In File dialog.
2. Choose the file to transfer in, and determine the location of the file.

- If you need to map to a network drive, click the **Network** button. Refer to your Windows documentation for more information about this function.
- Select the drive from the **Drives** drop down list.
- Select the directory in the **Directories** list box.
- Enter the file name in the **File Name** entry field, or highlight the file in the **File Name** list box.
- Click the **OK** button. Ink-Master prompts you to determine whether or not you want to attach any tags to your data.

3. If you want to attach tags to the transfer in data, click the **Yes** button. This opens the Select Tags dialog. Refer to Section Ten—Advanced Software Features.
4. If you are transferring in any data that already exists, answer all of the update prompts. See the beginning of this sub-section for more information about Update Prompts.

BACKING UP YOUR DATABASE

The **Backup Database…** function compresses the Ink-Master database (by more than 50%) so you can easily store most databases on a few floppy disks. The procedure is very flexible; any available drive and directory can be selected. If desired, it automatically creates new directories during backup.

NOTE: This backup function overwrites any database files that exist in the backup file destination or directory.

Backup Strategy

The accuracy of your data is the key ingredient to maintaining quality assurance with your Ink-Master software. To protect yourself against data loss, your database should be backed up on a regular basis. A disciplined schedule of backups is an essential part of this process. We suggest the following strategy for backing up your data.

This method is a cost-effective system for securing your data over a 12 week period (rolling backup). At least ten disks are required, allowing you to retrieve data up to three months old. (Additional disks may be required for months with five Fridays, or if your database backup is larger than one disk.)

NOTE: If you have both 0°/45° and spherical data, you should create a strategy for each type of database.

Disk #	Disk Label
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday 1
6	Friday 2
7	Friday 3
8	Month 1
9	Month 2
10	Month 3
11	Friday 4

The Backup Cycle:

1. Start the cycle on a Friday evening and backup your database onto the disk labeled **Friday 1**.
2. On Monday, backup the database onto the disk labeled **Monday**. Repeat the process on Tuesday, Wednesday, and Thursday using the corresponding disks.
3. On Friday, backup the database onto the disk labeled **Friday 2**. Repeat step 2, but when it comes to Friday again, use the disk labeled **Friday 3** for the complete weekly back up.
4. Repeat step 2 again, but when it comes to Friday, use the disk labeled **Month 1** for the complete monthly back up.
5. Repeat steps 2 through 4, but at the end of the fourth week use the disk labeled **Month 2** for the complete monthly back up.
6. Repeat steps 2 through 4, but at the end of the fourth week use the disk labeled **Month 3** for the complete monthly back up.

You now have a complete record of 12 weeks of data, and the same rotation cycle can start again.

Steps:

To backup your Ink-Master database, complete the following steps.

1. Select the **Backup Database…** function from the **File** menu. This opens the Backup Database dialog.
2. Enter the directory path of the database you want to backup in the **Backup From** entry field or select the path using the **Drives** drop down list and **Backup From** list box.

3. Enter the directory path of the database backup location in the **Backup To** entry field or select the path using the **Drives** drop down list and **Backup To** list box.
4. Select the **Backup…** button.

RESTORING YOUR DATABASE

The **Restore Database…** function decompresses the Ink-Master database from a backup file.

NOTE: This backup function overwrites any database files that exist in the restore file destination or directory.

Steps:
To restore your Ink-Master database, complete the following steps.

1. Select the **Restore Database…** function from the **File** menu. This opens the Restore Database dialog.
2. Enter the directory path of the database you want to restore in the **Restore From** entry field or select the path using the **Drives** drop down list and **Restore From** list box.
3. Enter the directory path of the database restore location in the **Restore To** entry field or select the path using the **Drives** drop down list and **Restore To** list box.
4. Select the **Restore…** button.

SECTION NINE

Viewing Your Data

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Section Nine discusses the functions that allow you to display your data in various “views.” The following views are found in the View menu: Tolerance, Controls, L*a*b*, FMC2, Spectral, Status Density, Trend, L*a*b* Data, Spectral Data, Status Density Data, Formula, Notes & Tags, Visual Color, Verbal Color, Indices, and Delete All.

This section also provides information about the Window menu items as well as View Specific items. Window menu items help you to determine how you want to display your “views” on the Ink-Master screen. View Specific items allow you to perform functions specific to the “view” or window that has focus.

VIEW MENU

Each “view” has its own window that is displayed on the Ink-Master screen. This window displays the data for the item that is selected from the **View** pull down menu. Each window can be maximized or minimized. (The Controls window can be *minimized* only.) A window is minimized to the lower left-hand corner of the Ink-Master screen.

NOTE: Each view’s View Specific menu item(s) are explained with the view description.

Steps:

To display a view, simply select the appropriate item from the **View** pull down menu.

WINDOW MENU

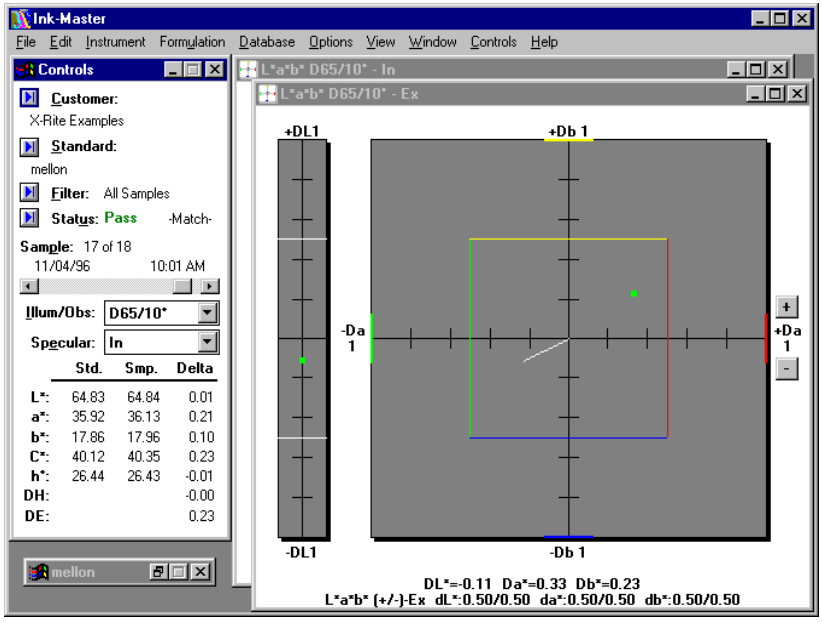
The Window menu allows you to arrange the view windows in a cascade or tile format. It also allows you to arrange minimized icons and to select the next available view window.

Steps:

To activate a Window menu function, simply select the item from the **Window** pull down menu, *or*, if available, use the function’s short-cut keys.

Cascade

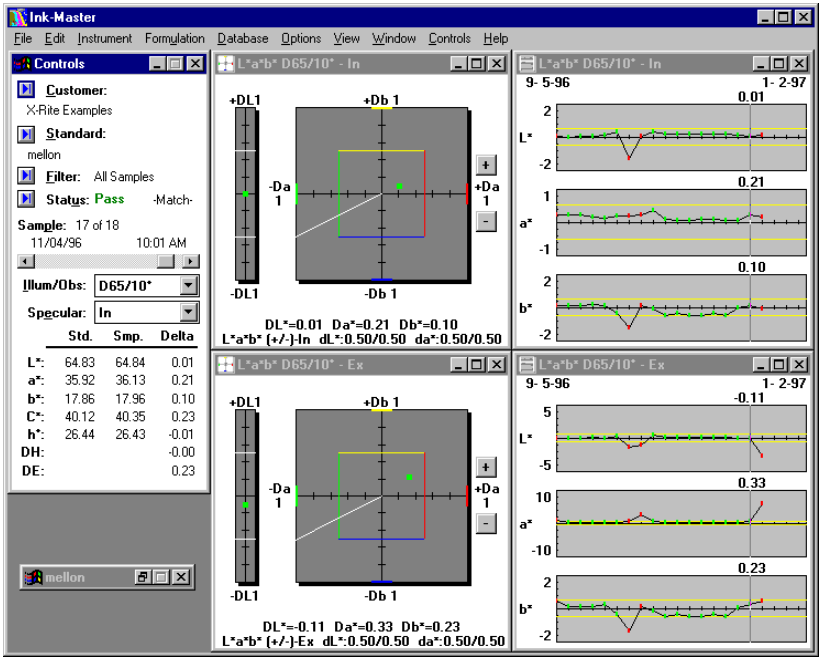
The **Cascade** function arranges the displayed view windows (*except* the Controls window) in a stacked order. See below. The short-cut keys for this function are **Shift+F5**.



Tile

The **Tile** function arranges the displayed view windows (*except* the Controls window) so each window fits in the Ink-Master screen. See below. The short-cut keys for this function are **Shift+F4**.

NOTE: Tile is the default setting.



Arrange Icons

The **Arrange Icons** function automatically arranges the *minimized* view windows in the lower left-hand corner of the Ink-Master screen.

Next Window

The **Next Window** function shifts the focus from one view window to another. The short-cut keys for this function are **Ctrl+Tab**.

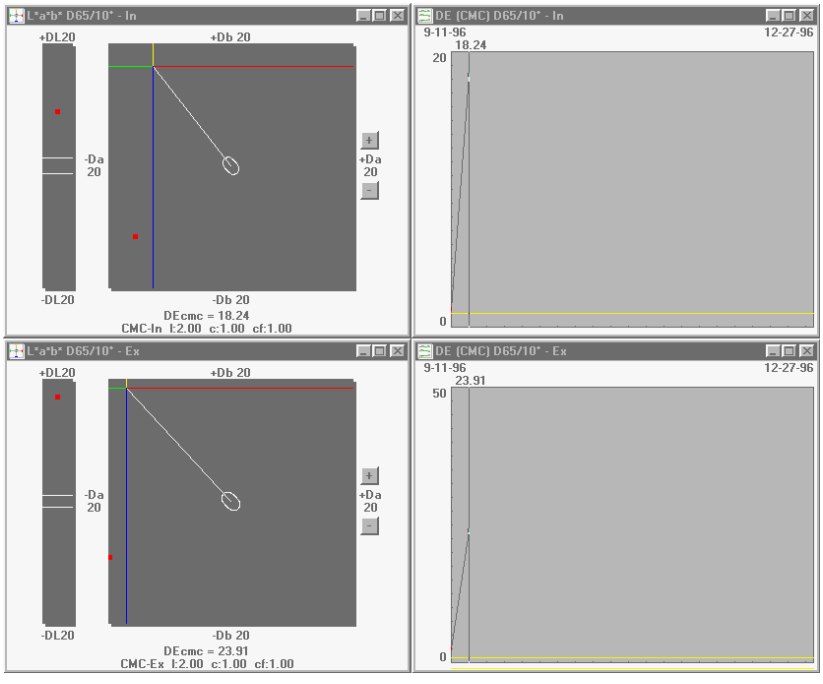
VIEW SPECIFIC MENU

The View Specific menu provides functions that are specific to the view window that has focus. For example, if you click on the Controls window, this gives the Controls window focus, and the **Controls** View Specific menu appears in the menu bar.

NOTE: Each view's View Specific menu item(s) are explained with the view description.

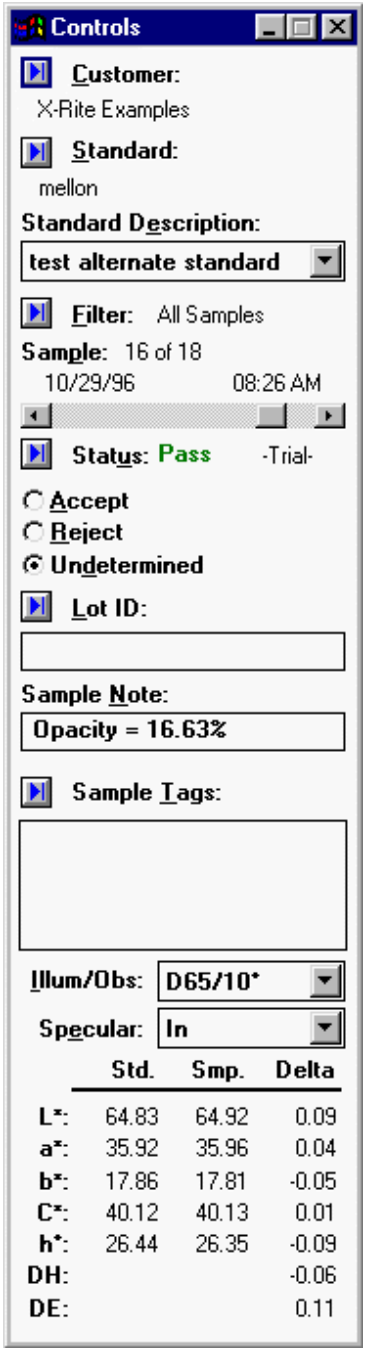
TOLERANCE VIEW

The **Tolerance** pop up menu items, **L*a*b*** and **Trend**, display all the available tolerances preset for the displayed standard. The tolerances are displayed as L*a*b* and FMC2 graphs *or* Trend graphs. If a different standard is selected, the screen does not change unless Auto L*a*b* or Auto Trend is activated. To activate Auto L*a*b* or Auto Trend, refer to the Display options in Section Four—Setting Up Your Software.



CONTROLS VIEW

The **Controls** item displays the Controls window. The Controls window items are described in Section Three—User Interface. To determine which items appear in the Controls window, refer to the Display options in Section Four—Setting Up Your Software.


Controls
Customer:
X-Rite Examples
Standard:
mellon
Standard Description:
test alternate standard
Filter: All Samples
Sample: 16 of 18
10/29/96 08:26 AM
Status: Pass -Trial-
Accept
Reject
Undetermined
Lot ID:
Sample Note:
Opacity = 16.63%
Sample Tags:
Illum/Obs: D65/10°
Specular: In
Std. Smp. Delta
L*: 64.83 64.92 0.09
a*: 35.92 35.96 0.04
b*: 17.86 17.81 -0.05
C*: 40.12 40.13 0.01
h*: 26.44 26.35 -0.09
DH: -0.06
DE: 0.11

Controls Menu

The **Controls** menu contains the following functions:

- **Delete Sample** - This function deletes the sample currently selected in the Controls window. A confirmation dialog appears once this function is selected. Click the **OK** button to delete the sample.
- **Delete Set** - This function deletes the entire sample set currently selected in the Controls window. A confirmation dialog appears once this function is selected. Click the **OK** button to delete the sample set.
- **Print** - This function prints the Controls window.
- **Auto Assign** - This function automatically assigns an **Accept** or **Reject** status to the currently selected sample based on it's Pass/Fail status. A check mark appears next to this menu item when it is active.

Steps:

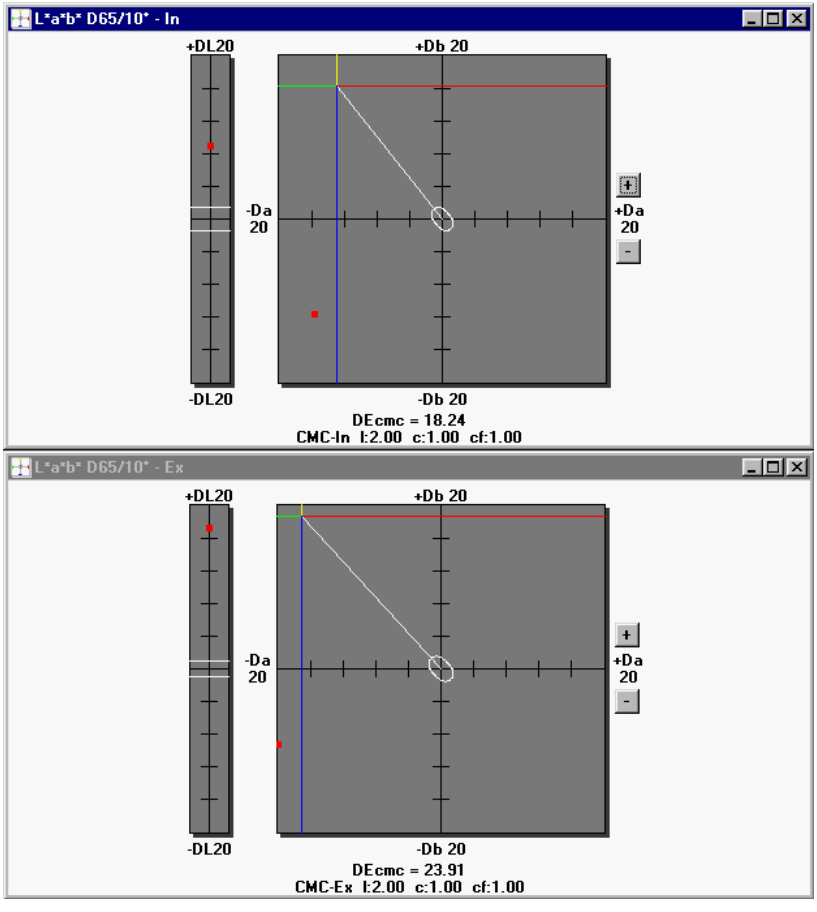
To select a Controls menu function, simply select the item from the **Controls** pull down menu.

L*a*b* VIEW

For a 0°/45° Instrument, the **L*a*b*** item displays the L*a*b* window. *For a sphere instrument*, L*a*b* data is displayed through the following **L*a*b*** pop up menu items:

- **Specular Included** - displays included data in an L*a*b* window.
- **Specular Excluded** - displays excluded data in an L*a*b* window.
- **Both** - displays included data in an L*a*b* window *and* excluded data in another L*a*b* window.

An L*a*b* window contains the selected sample (green = pass, red = fail) and standard with the selected illuminant/observer in an L*a*b* color space graph. It contains the CMC tolerance, the Delta Difference, and the tolerance values. The **+** (plus) button increases the viewing scale and the **-** (minus) button decreases the viewing scale. The viewing scale ranges from 1 to 200 times (1, 2, 5, 10, 20, 100, and 200).



L*a*b* Menu

The **L*a*b*** menu contains the following functions:

- **Illum/Obs** - This function allows you to select an illuminant/observer pair to use in the selected L*a*b* window. A standard list of illuminant/observer pairs is available, as well as a selection for the Controls window illuminant/observer pair: **Controls**. A check mark indicates the selected illuminant/observer.
- **Zoom In** - This function increases the viewing scale, allowing a closer view of the L*a*b* graph. It performs the same function as the **+** (plus) button in the L*a*b* window.
- **Zoom Out** - This function decreases the viewing scale. It performs the same function as the **-** (minus) button in the L*a*b* window.

- **Auto Scale** - This function automatically scales the L*a*b* graph according to the selected sample. A check mark appears next to this menu item when it is active.
- **Scatter Plot** - This function displays all the samples in the sample set on one L*a*b* graph. The currently selected sample is highlighted either green (pass) or red (fail). A check mark appears next to this menu item when it is active.
- **Copy** - This function copies the L*a*b* graph to the clipboard.
- **Print** - This function prints the L*a*b* window.

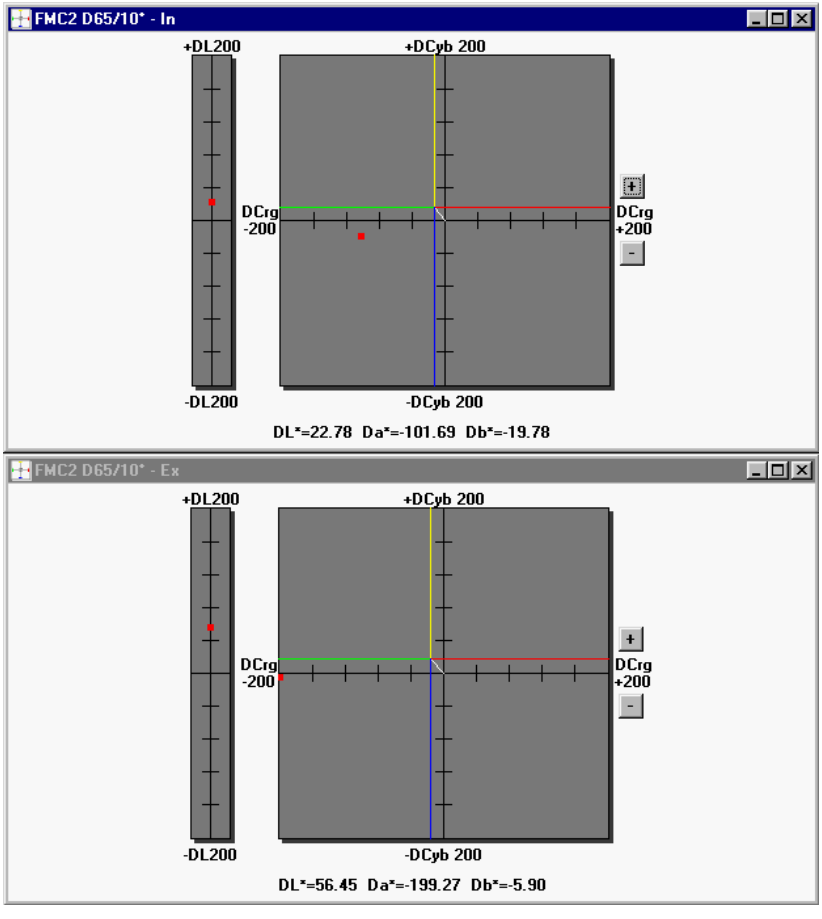
Steps:
To select an L*a*b* menu function, simply select the item from the **L*a*b*** pull down menu.

FMC2 VIEW

For a 0°/45° Instrument, the **FMC2** item displays the FMC2 window. *For a sphere instrument*, L*a*b* data is displayed through the following **FMC2** pop up menu items:

- **Specular Included** - displays included data in an FMC2 window.
- **Specular Excluded** - displays excluded data in an FMC2 window.
- **Both** - displays included data in an FMC2 window *and* excluded data in another FMC2 window.

An FMC2 window contains the selected sample (green = pass, red = fail) and standard with the selected illuminant/observer in a color space. It contains the L*C*H* tolerance, the Delta Difference, and the tolerance value. The **+** (plus) button increases the viewing scale and the **-** (minus) button decreases the viewing scale. The viewing scale ranges from 1 to 200 times (1, 2, 5, 10, 20, 100, and 200).



FMC2 Menu

The **FMC2** menu contains the following functions:

- **Illum/Obs** - This function allows you to select an illuminant/observer pair to use in the selected FMC2 window. A standard list of illuminant/observer pairs is available, as well as a selection for the Controls window illuminant/observer pair: **Controls**. A check mark indicates the selected illuminant/observer.
- **Zoom In** - This function increases the viewing scale, allowing a closer view of the FMC2 graph. It performs the same function as the **+** (plus) button in the FMC2 window.
- **Zoom Out** - This function decreases the viewing scale. It performs the same function as the **-** (minus) button in the FMC2 window.

- **Auto Scale** - This function automatically scales the FMC2 graph according to the selected sample. A check mark appears next to this menu item when it is active.
- **Scatter Plot** - This function displays all the samples in the sample set on one FMC2 graph. The currently selected sample is highlighted either green (pass) or red (fail). A check mark appears next to this menu item when it is active.
- **Copy** - This function copies the FMC2 graph to the clipboard.
- **Print** - This function prints the FMC2 window.

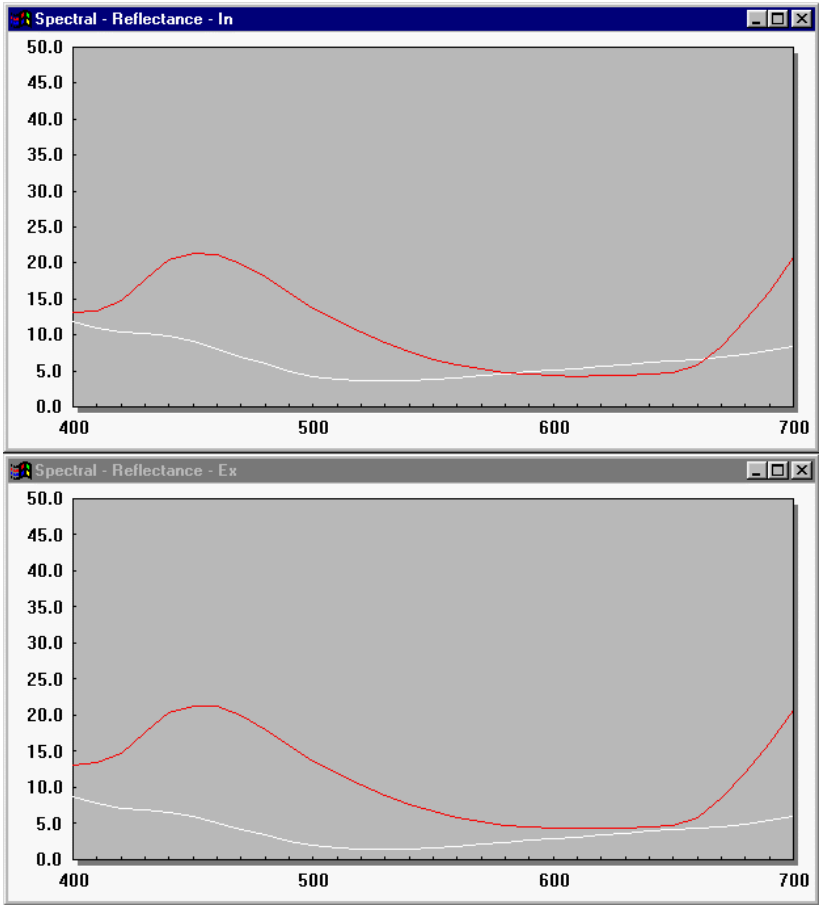
Steps:
To select an FMC2 menu function, simply select the item from the **FMC2** pull down menu.

SPECTRAL VIEW

For a 0°/45° Instrument, the **Spectral** item displays the Spectral window. *For a sphere instrument,* spectral data is displayed through the following **Spectral** pop up menu items:

- **Specular Included** - displays included data in a Spectral window.
- **Specular Excluded** - displays excluded data in a Spectral window.
- **Both** - displays included data in a Spectral window *and* excluded data in another Spectral window.

A Spectral window displays either reflectance or density data for the selected sample (green = pass, red = fail) and standard (white) as spectral curves in 10 Nanometer increments. The type of spectral data, reflectance or density, is determined in the **Spectral** View Specific menu.



Spectral Menu

The **Spectral** menu contains the following functions:

- **Reflectance** - This function displays the spectral data as Reflectance values on a curve. A check mark appears next to this menu item when it is active. The short-cut keys for this function are **Ctrl+R**.
- **Density** - This function displays the spectral data as Density values on a curve. A check mark appears next to this menu item when it is active. The short-cut keys for this function are **Ctrl+D**.
- **Scale** - This function opens the Rescale Graph dialog which allows you to enter the lower reflectance or density value in the **Lower** entry field and the upper reflectance or density value in the **Upper** entry field. Check the **Auto Scale** check box to let Ink-Master

automatically scale reflectance axis. Click the **OK** button to accept the scale settings.

- **Copy** - This function copies the Spectral window to the clipboard.
- **Print** - This function prints the Spectral window.
- **Grid** - This function displays a grid in the spectral graph. A check mark appears next to this menu item when it is active.
- **Mark** - This function places a vertical line at a selected wavelength and displays the standard values (white), the sample value (green = pass; red = fail), the difference value, and the wavelength selected. Wavelengths can be selected only in 10 nanometer intervals. To select a wavelength, simply click the cross-hair cursor on the desired wavelength. A check mark appears next to this menu item when it is active.
- **Track** - This function displays the exact value and wavelength for a selected point on the curve. To select a point on the curve, simply place the cross-hair cursor on the point. A check mark appears next to this menu item when it is active.
- **Range** - This function displays the measurement variation of the sample set curves. The upper and lower range curves are gray. A check mark appears next to this menu item when it is active.

Steps:
To select a Spectral menu function, simply select the item from the **Spectral** pull down menu.

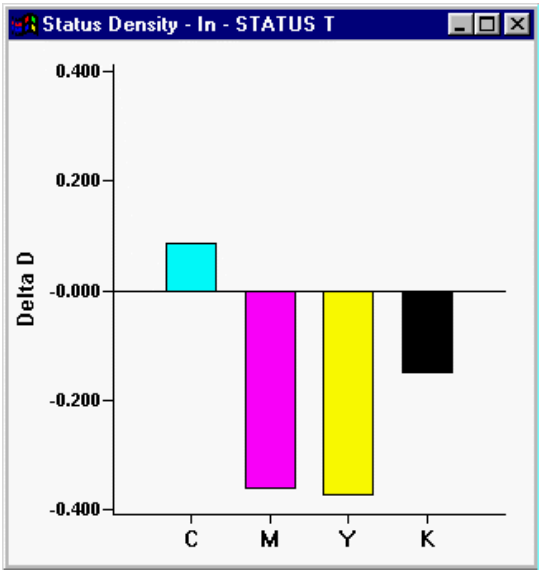
STATUS DENSITY VIEW

The **Status Density…** item opens the Status Density View Options dialog. This dialog allows you to choose the Status Type to display in the Status Density window. The Status Density window contains a bar graph of the density data for the status type chosen. It also displays any tolerances that have been defined.

The following is a list of the Status Types available in the Status Density View Options dialog.

- **Status A**, **Status E**, **Status I**, and **Status T** - display the highest Cyan, Magenta, Yellow, and Visual density values for the sample and standard.
- **Spectral** and **Spectral X** - display the sample and standard density values for the selected wavelength. This wavelength is automatically selected and displayed in the Status Density View Options dialog. However, you may change it.

- **HiFi** - displays the highest Cyan, Magenta, Yellow, Visual, Red, Green, and Blue density values for the sample and standard.
- **Hexachrome** - displays the highest Cyan, Magenta, Yellow, Visual, Green, and Orange density values for the sample and standard



Steps:
To determine and display the status density, complete the following steps.

1. Once the Status Density View Options dialog is open, select the desired status density type from the **Status Type** list box.
2. *For spherical instruments only*, select the appropriate radio button, **Included** or **Excluded**.
3. *For Spectral or Spectral X status types only*, select the wavelength for the data displayed.
4. Click the **OK** button. This opens the Status Density window.

Status Density Menu
The **Status Density** menu contains the following functions:

- **Tolerance Bars** - This function displays tolerance bars on the Status Density bar graph. A check mark appears next to this menu item when it is active.
- **Zoom** - This pop up menu allows you to select a zoom percentage for the Status Density bar graph. The following is a list of percentages:

100%, 200%, 150%, 125%, 75%, 50%, and 25%. A check mark appears next to the selected zoom percentage.

Steps:
To select a Status Density menu function, simply select the item from the **Status Density** pull down menu.

TREND VIEW

The **Trend…** item opens the Trend Options dialog. This dialog allows you to choose the type of data to display in the Trend window. The Trend window contains measurement data displayed on a point graph, plotted horizontally against time.

If you select one of the following data types, you also need to select an illuminant/observer pair:

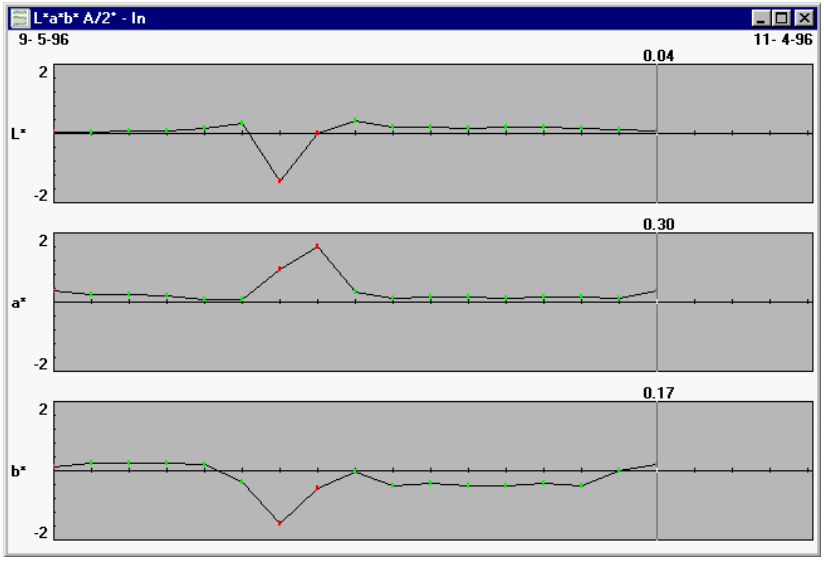
- **L*a*b***
- **L*C*H***
- **DE**
- **DE (CMC)**
- **Metamerism**
- **Strength (Apparent)**
- **Strength (Chromatic)**
- **Strength (Tristimulus)**
- **Yellowness (ASTM E313)**
- **Yellowness (ASTM D1925)**
- **Whiteness (ASTM E313)**
- **Brightness**
- **DE (FMC2)**

If you select one of the following data types, you also need to select the appropriate color:

- **Status Density (Status A)**
- **Status Density (Status E)**
- **Status Density (Status I)**
- **Status Density (Status T)**
- **Status Density (HiFi)**
- **Status Density (Hexachrome)**

If you select one of the following data types, you also need to select the appropriate wavelength:

- **Status Density (Spectral)**
- **Status Density (Spectral X)**



Steps:
To determine and display trend data, complete the following steps.

1. Once the Trend Options dialog is open, select the desired data type from the **Type** list box. (Use the scroll bar to view all types.)
2. Depending on the data type you selected, select either the desired illuminant/observer from the **Illuminant** list box, *or* the desired color from the **Color** drop down list, *or* the desired wavelength from the **Wavelength** drop down list.
3. *For spherical instruments only*, select the appropriate radio button, **Included** or **Excluded**.
4. Click the **OK** button. This opens the Trend window.

Trend Menu
The **Trend** menu contains the following functions:

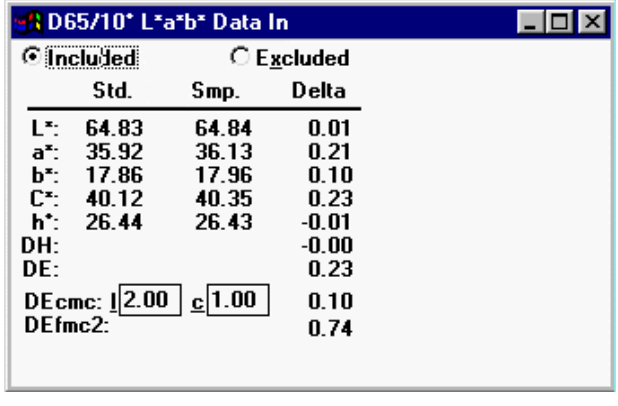
- **Copy** - This function copies the Trend window to the clipboard.
- **Print** - This function prints the Trend window.
- **Viewport** - This function opens the Set Trend Viewport dialog which allows you to enter in the **Range** entry field the amount of samples displayed at one given time. Click the **OK** button to accept the range.

- **Control Limits** - This function displays the upper and lower control limits on the trend graph. A check mark appears next to this menu item when it is active.
- **Grid** - This function displays a grid in the trend graph. A check mark appears next to this menu item when it is active.

Steps:
To select a Trend menu function, simply select the item from the **Trend** pull down menu.

L*A*B* DATA VIEW

The **L*a*b* Data** item displays the L*a*b* Data window. The L*a*b* Data window contains the following values for the selected sample and standard: L*, a*, b*, C*, h°, DH, DE, DEcmc, and DEFMC2. *For spherical instruments only*, this window also contains **Included** and **Excluded** radio buttons. You may view included or excluded data by selecting the appropriate radio button.



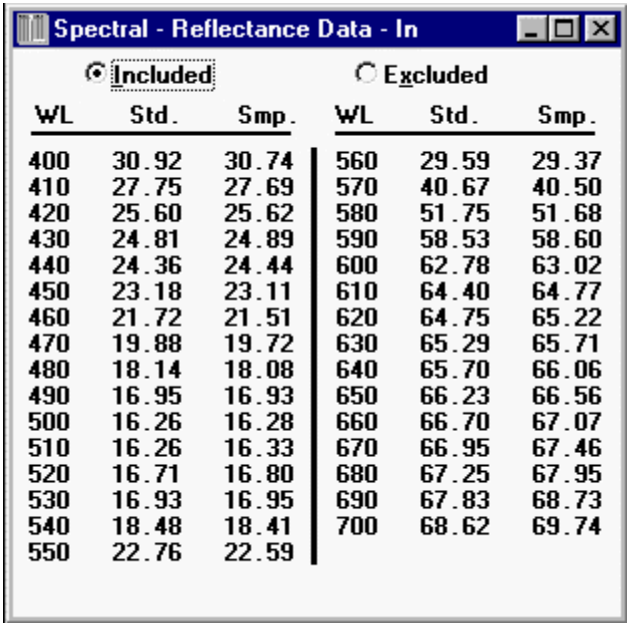
L*a*b* Data Menu
The **L*a*b* Data** menu contains the following functions:

- **Illum/Obs** - This function allows you to select an illuminant/observer pair to use in the selected L*a*b* Data window. A standard list of illuminant/observer pairs is available, as well as a selection for the Controls window illuminant/observer pair: **Controls**. A check mark indicates the selected illuminant/observer.
- **Print** - This function prints the L*a*b* Data window.

Steps:
To select an L*a*b* Data menu function, simply select the item from the **L*a*b* Data** pull down menu.

SPECTRAL DATA VIEW

The **Spectral Data** item displays the Spectral Data window. The Spectral Data window contains the spectral values for the selected sample and selected standard at 10 Nanometer intervals. *For spherical instruments only*, this window also contains **Included** and **Excluded** radio buttons. You may view included or excluded data by selecting the appropriate radio button.



WL	Std.	Smp.	WL	Std.	Smp.
400	30.92	30.74	560	29.59	29.37
410	27.75	27.69	570	40.67	40.50
420	25.60	25.62	580	51.75	51.68
430	24.81	24.89	590	58.53	58.60
440	24.36	24.44	600	62.78	63.02
450	23.18	23.11	610	64.40	64.77
460	21.72	21.51	620	64.75	65.22
470	19.88	19.72	630	65.29	65.71
480	18.14	18.08	640	65.70	66.06
490	16.95	16.93	650	66.23	66.56
500	16.26	16.28	660	66.70	67.07
510	16.26	16.33	670	66.95	67.46
520	16.71	16.80	680	67.25	67.95
530	16.93	16.95	690	67.83	68.73
540	18.48	18.41	700	68.62	69.74
550	22.76	22.59			

The type of spectral data, reflectance or density, is determined in the **Spectral Data** View Specific menu.

Spectral Data Menu

The **Spectral Data** menu contains the following functions:

- **Reflectance** - This function displays the spectral data as Reflectance values. A check mark appears next to this menu item when it is active. The short-cut keys for this function are **Ctrl+R**.

- **Density** - This function displays the spectral data as Density values. A check mark appears next to this menu item when it is active. The short-cut keys for this function are **Ctrl+D**.
- **Print** - This function prints the Spectral window. *For spherical instruments only*, choose either included or excluded data by selecting the appropriate radio button, **Included** or **Excluded**, in the Spectral Data window.

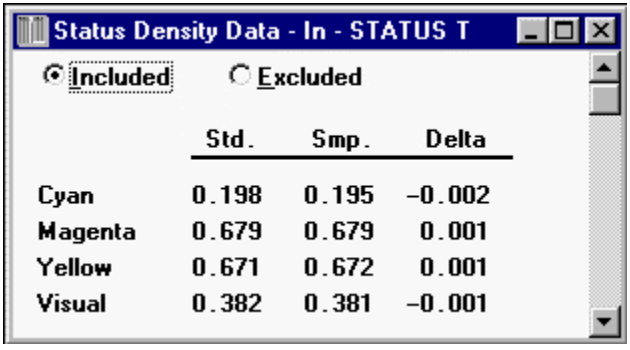
Steps:
To select a Spectral Data menu function, simply select the item from the **Spectral Data** pull down menu.

STATUS DENSITY DATA VIEW

The **Status Density Data…** item opens the Status Density View Options dialog. This dialog allows you to choose the Status Type to display in the Status Density Data window. The Status Density Data window contains the density values for the chosen data type.

The following is a list of the Status Types available in the Status Density View Options dialog.

- **Status A**, **Status E**, **Status I**, and **Status T -** display the highest Cyan, Magenta, Yellow, and Visual density values for the sample and standard as well as delta values.
- **Spectral** and **Spectral X -** display the sample and standard density values for the selected wavelength as well as the delta value. This wavelength is automatically selected and displayed in the Status Density View Options dialog. However, you may change it.
- **HiFi -** displays the highest Cyan, Magenta, Yellow, Visual, Red, Green, and Blue density values for the sample and standard as well as delta values.
- **Hexachrome -** displays the highest Cyan, Magenta, Yellow, Visual, Green, and Orange density values for the sample and standard as well as delta values.



Steps:
To determine and display the status density data, complete the following steps.

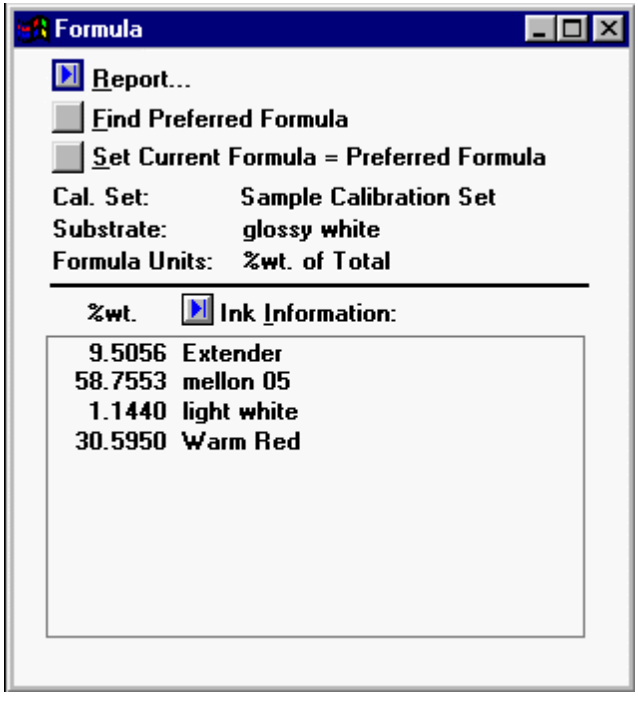
1. Once the Status Density View Options dialog is open, select the desired status density type from the **Status Type** list box.
2. *For spherical instruments only*, select the appropriate radio button, **Included** or **Excluded**.
3. *For Spectral or Spectral X status types only*, select the wavelength for the data displayed.
4. Click the **OK** button. This opens the Status Density Data window.

FORMULA VIEW

The **Formula** item opens the Formula window. This window contains the following items.

- **Report…** - arrow button opens the New Formula Report dialog. Refer to Section Six—Formulating.
- **Find Preferred Formula** - button displays the “Preferred Formula.”
- **Set Current Formula = Preferred Formula** - button sets the currently displayed formula as the “Preferred Formula.”
- **Cal. Set -** shows the calibration set for the formula. Refer to Section Five—Establishing Your Database.
- **Substrate -** shows the substrate for the formula. The substrate is determined when formulating. Refer to Section Six—Formulating.
- **Formula Units -** shows the formula units for the formula. The units are determined by the calibration set. Refer to Section Five—Establishing Your Database.

- **Ink Information -** arrow button opens the Ink Information dialog which lists the ink amount, ink name, and ink calibration set for each ink in the formula.
- **formula** - area displays the components and amounts for the formula.



Formula Menu

The **Formula** menu contains one function: **Print**. This function prints the Formula window.

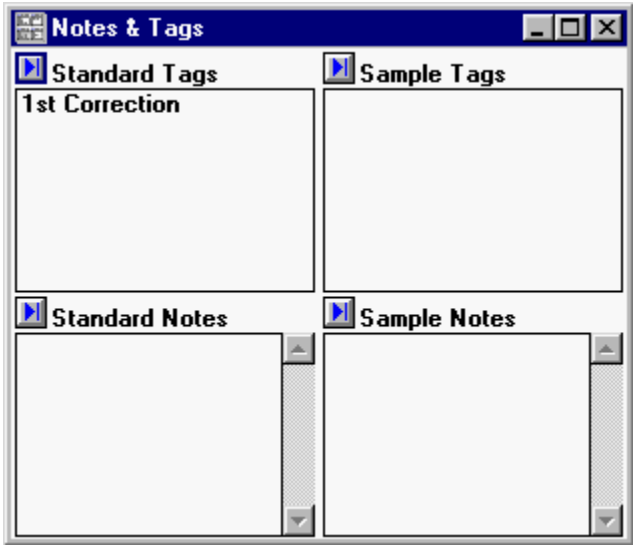
Steps:

To print the Formula window, simply select the **Print** item from the **Formula** pull down menu.

NOTES & TAGS VIEW

The **Notes & Tags** item opens the Notes & Tags window. This window contains display areas for the currently selected standard and sample. The **Standard Tags** and **Sample Tags** arrow buttons open the Select Tags dialog. The **Standard Notes** and **Sample Notes** arrow buttons open the Note Editor.

Attaching notes and tags to a sample is covered in Section Seven—Basic Techniques.



Steps:
To attach notes and tags to a standard, complete the following steps.

1. Click the **Standard Notes** arrow button.
2. Enter or edit the standard's note in the Note Editor. Refer to the Section Seven—Basic Techniques. When complete, the note appears in the **Standard Notes** display area.
3. In the Notes & Tags view window, click the **Standard Tags** arrow button. This opens the Select Tags dialog.
4. Highlight the tag you want to select in the **Available Tags** list box and click the **Include >** button to move it to the **Selected Tags** list box. (To remove an ink from the **Selected Tags** list box, highlight it and click the **Remove <** button.)
5. Repeat step 4 for each tag you want to attach. To create a new tag, refer to Section Ten—Advanced Software Features.
6. Click the **OK** button to attach the tag(s).

Notes & Tags Menu

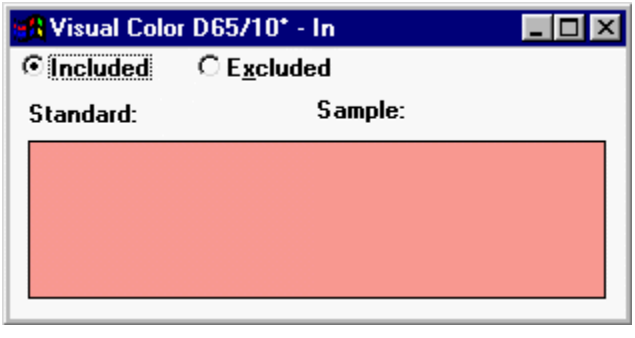
The **Notes & Tags** menu contains one function: **Print**. This function prints the Notes & Tags window.

Steps:
To print the Notes & Tags window, simply select the **Print** item from the **Notes & Tags** pull down menu.

VISUAL COLOR VIEW

The **Visual Color** item opens the Visual Color window. This window is is intended to be used as a tool for color difference comparison between a sample and the standard. The colors that are displayed do not exactly match the actual colors. *For spherical instruments only*, this window also contains **Included** and **Excluded** radio buttons. You may view the included or excluded visual colors by selecting the appropriate radio button. You may also view the visual colors under different illuminants through the **Visual** View Specific menu.

NOTE: Visual color is not supported in 16-color display mode. The 256-color display mode must be used with this View item.



Visual Color Menu
The **Visual Color** menu contains the following functions:

- **Illum/Obs** - This function allows you to select an illuminant/observer pair to use in the selected Visual Color window. A standard list of illuminant/observer pairs is available, as well as a selection for the Controls window illuminant/observer pair: **Controls**. A check mark indicates the selected illuminant/observer.
- **Print** - This function prints the Visual Color window. *For spherical instruments only*, choose either included or excluded data by selecting the appropriate radio button, **Included** or **Excluded**, in the Visual Color window.

Steps:
To select a Visual Color menu function, simply select the item from the **Visual Color** pull down menu.

VERBAL COLOR VIEW

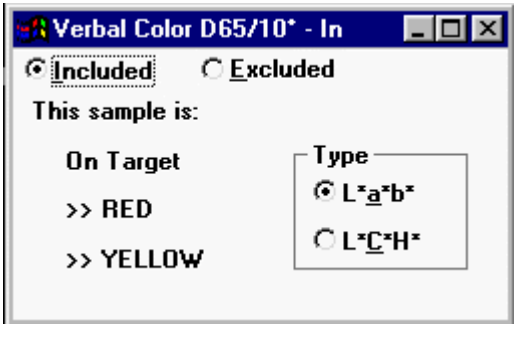
The **Verbal Color** item opens the Verbal Color window. This window allows you to verbally compare the color difference between a sample and the standard using L*a*b* or L*C*H* color tolerancing. The Verbal window indicates the color direction and intensity for either the L*a*b* color space or the L*C*H* color space.

The following lists the direction indicators for each color space value, L*, a*, b*, C*, and H*. (The L* direction indicator is the same for both L*a*b* and L*C*H* tolerancing.)

NOTE: A color space value that is acceptable displays "**On Target**."

- **L*** - direction is indicated by either **Light** or **Dark**.
- **a*** - direction is indicated by either **Red** or **Green**.
- **b*** - direction is indicated by either **Blue** or **Yellow**.
- **C*** - direction is indicated by either **Bright** or **Dull**.
- **H*** - direction is indicated by either **Red**, **Green**, **Blue**, or **Yellow**.

For spherical instruments only, this window also contains **Included** and **Excluded** radio buttons. You may view the included or excluded verbal colors by selecting the appropriate radio button. You may also view the verbal colors under different illuminants through the **Verbal** View Specific menu.



Verbal Color Menu

The **Verbal Color** menu contains the following functions:

- **Illum/Obs** - This function allows you to select an illuminant/observer pair to use in the selected Verbal Color window. A standard list of illuminant/observer pairs is available, as well as a selection for the Controls window illuminant/observer pair: **Controls**. A check mark indicates the selected illuminant/observer.
- **Print** - This function prints the Verbal Color window. *For spherical instruments only*, choose either included or excluded data by selecting the appropriate radio button, **Included** or **Excluded**, in the Verbal Color window.

Steps:

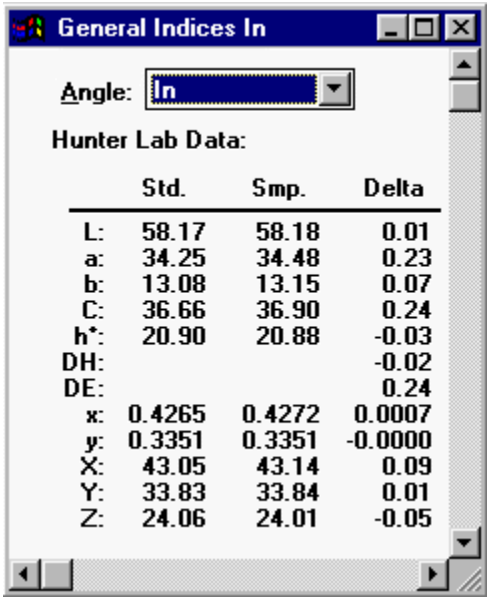
To select a Verbal Color menu function, simply select the item from the **Verbal Color** pull down menu.

INDICES VIEW

There are two **Indices** views: **General** and **Textile**. The following describes these two views.

General Indices

The **General** function displays Hunter Lab Data for the selected sample and standard, and it also displays their delta values. *For spherical data only*, you must determine the angle of specular Hunter Lab data to display, included or excluded. To select the angle for the Hunter Lab Data, simply select the angle, **In** (included) or **Ex** (excluded) from the **Angle** drop down list.



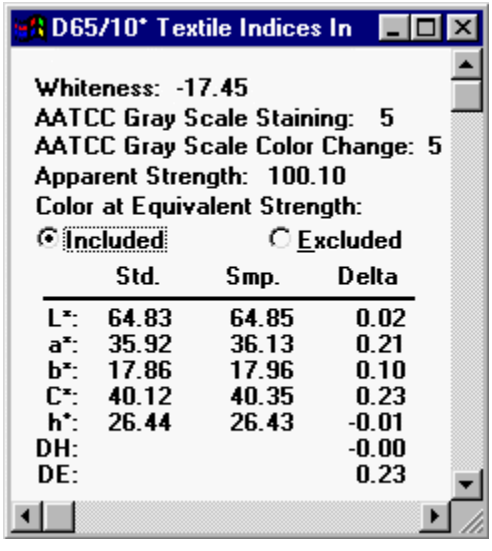
Textile Indices

The **Textile** function displays the following index data. *For spherical data only*, indices can be viewed in specular included or excluded by clicking the appropriate radio button, **Included** or **Excluded**.

- **Whiteness** - An index for evaluation of white and near-white samples. These samples yield numbers which correlate with visual rating of whiteness.
- **AATCC Gray Scale Staining** - This feature automates the visual evaluation procedure defined in the AATCC Technical Manual - Evaluation Procedure 2. It is meant to test the staining of undyed textile specimens in the colorfastness test. The “standard” should be the undyed textile and the “sample” or “trial” should be the stained textile. A rating of 5 indicates that little staining occurs, meaning that the sample has good colorfastness. As the numeric values get lower, the colorfastness degrades, causing greater staining. Hyphenated values (e.g., 3-4) indicate that the fastness is halfway between 3 and 4. All evaluations are performed under D_{65} 10° illumination, per the specification. If the color difference exceeds 40 DE, the fastness grade is zero. This method is equivalent to ISO 105-A03.
- **AATCC Gray Scale Color Change** - This feature automates the visual evaluation procedure defined in the AATCC Technical Manual

- Evaluation Procedure 1. It is meant to test the colorfastness of textile samples by comparing the color of untreated and treated specimens. The “standard” should be the untreated sample and the “sample” or “trial” should be the treated or washed sample. A rating of 5 indicates that little color change occurs, meaning that the sample has good colorfastness. As the numeric values get lower the colorfastness is degrading. Hyphenated values (e.g., 3-4) indicate that the colorfastness is half way between 3 and 4. All evaluations are performed under D_{65} 10° illumination, per the specification. If the color difference exceeds 16 DE, the colorfastness grade will be 0. This method is equivalent to ASTM D 2616 and ISO 105-A02.

- **Apparent Strength** - This feature is well suited for comparison of colors with moderate chroma. Dull colors usually fail to have a significant “dip” or low point in the reflectance curve which shows the absorption of the dye. Apparent strength is evaluated across the entire spectrum.
- **Color at Equivalent Strength** - This feature predicts what the color of a textile would be if the strength of the sample were adjusted to match the standard. It uses the Apparent Strength value in the computation to adjust the reflectance curve of the sample. New colorimeteric data is then computed from the adjusted curve. The accuracy of this procedure degrades as the strength adjustment increases. In the rare case that **Apparent Strength** is zero, then no adjustment will be performed.



Indices Menu

The **Indices** menu contains one function: **Illum/Obs**. This function allows you to select an illuminant/observer pair to use in the selected Indices window. A standard list of illuminant/observer pairs is available, as well as a selection for the Controls window illuminant/observer pair: **Controls**. A check mark indicates the selected illuminant/observer.

Steps:

To select an illuminant/observer for Indices, simply select the illuminant/observer from the **Indices** pull down menu.

DELETE ALL

The **Delete All** function removes all of the currently displayed windows, *except* the Controls window, from the Ink-Master application screen.

SECTION TEN

Advanced Software Features

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Section Ten discusses Ink-Master functions and features for the advanced user. All of these features enhance the way Ink-Master works as well as the way *you* work.

CREATING FILTERS

A filter provides a fast means of selecting specific sets of information for evaluation (e.g., samples, standards, or inks). A filter selects sets of information based on search criteria. For example, a filter can select all the samples that were measured into the database on a specific date. For instructions on how to use filters, refer to Section Seven—Managing Your Data.

Ink-Master comes with several basic filters for each type, but also allows you to create, edit, and delete filters. Below lists the three types of filters:

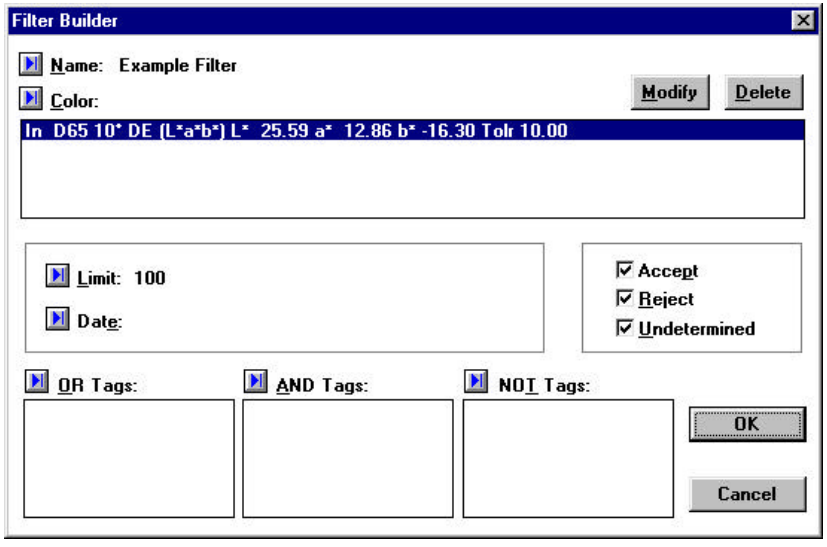
- **Sample Filter** - allows you to select a set of samples (trials and matches) that share common parameters.
- **Standard Filter** - allows you to select a specific standard.
- **Ink Filter** - allows you to select inks that share common ink tags.

Create, Edit, or Delete a Sample Filter

Creating and editing sample filters is done in the Filter Builder dialog. This dialog contains the following items.

- **Name -** This arrow button allows you to name the filter.
- **Color** - This arrow button opens the Color Search Criteria so you can specify the search criteria for color data. The color data appears in the field.
- **Limit** - This arrow button opens the Limit Search Criteria so you can specify the maximum number of samples selected with the filter. The limit appears in the field.
- **Date** - This arrow button opens the Date Search Criteria so you can specify the date range of the samples selected by the filter. The **Today** radio button selects the samples measured today. The **This Week** radio button selects the samples measured this week. The **This Month** radio button selects the samples measured this month. The **This Year** radio button selects the samples measured this year. The **Use Above Information** radio button selects the samples measured during the date and time range specified in the **From** and **To** fields. The date and time search criteria appears in the field.
- **Accept/Reject Status** - These three check boxes (**Accept**, **Reject**, and **Undetermined**) allow you to filter samples from the database whose status match any of the checked statuses. Any combination of the boxes can be checked.

- **OR Tags** - This arrow button opens the Select Tags dialog which allows you to select tags to include in the **OR Tags** list. OR Tags search criteria selects samples whose tags match one or more of the tags in the **OR Tags** list.
- **AND Tags** - This arrow button opens the Select Tags dialog which allows you to select tags to include in the **AND Tags** list. AND Tags search criteria only selects samples whose tags include all of the tags in the **AND Tags** list.
- **NOT Tags** - This arrow button opens the Select Tags dialog which allows you to select tags to include in the **NOT Tags** list. NOT Tags search criteria does not select samples whose tags match any tags in the **NOT Tags** list.



Opening the Filter Builder Dialog—Steps:
To open the Filter Builder dialog to create or edit a Sample Filter, complete the following steps.

1. Select the **Sample Filters…** function in the **Edit Filters** pop up window from the **Database** menu, *or* click the **Filter** arrow button in the Controls window. This opens the Filters dialog.
2. Choose to create or edit a Sample Filter:
   - To create a Sample Filter, click the **Create…** button. This opens the Filter Builder dialog.

- To edit an existing Sample Filter, highlight the filter you want to edit and click the **Edit…** button. This opens the filter's search criteria in the Filter Builder dialog.

Naming Your Sample Filter—Steps:
To enter or edit the Sample Filter name, complete the following steps.

1. Click the **Name** arrow button. This opens the Name Search Criteria dialog.
2. Enter or edit the name in the **Name** field.
3. Click **OK**.

Setting Color Search Criteria—Steps:
To *enter* color search criteria, complete the following steps.

NOTE: The color target defaults to the current standard. If you wish to use a different target, you may enter its L*a*b* values in the **Targets** fields.

---

1. Click the **Color** arrow button. This opens the Color Search Criteria dialog.
2. Select the type of color data from the **Type** drop down list.
3. Select the illuminant/observer from the **Illum/Obs** drop down list.
4. Select the tolerance method from the **Tolerance** drop down list.
5. If the tolerance method is either **DE (L*a*b*)** or **DE (CMC 2:1)**, enter the Delta E tolerance in the **DE (method)** field.
6. If the tolerance method is **DL*Da*Db*** or **DL*DC*DH***, enter the tolerance values in the **Tolerance** fields.
7. *For spherical instruments only*, select the specular search method (included or excluded) by clicking the **Included** or **Excluded** radio button.
8. Click **OK**.

To *edit* color search criteria, complete the following steps.

1. Highlight the color search criteria you want to edit.
2. Click the **Modify** button or double-click on the color search criteria itself. This opens the Color Search Criteria dialog.
3. Edit any of the search criteria in the same manner as creating search criteria.
4. Click **OK**.

To *delete* color search criteria, complete the following steps.

1. Highlight the color search criteria you want to delete.
2. Click the **Delete** button.

Setting the Filter Limit—Steps:
To enter or edit the limit for the filter, complete the following steps.

1. Click the **Limit** arrow button. This opens the Limit Search Criteria dialog.
2. Enter or edit the maximum number of samples to select, *or* click **Don't Care** if you don't want to set a maximum number.
3. Click **OK**.

Setting Date Search Criteria—Steps:
To enter or edit the date search criteria, complete the following steps.

1. Click the **Date** arrow button. This opens the Date Search Criteria dialog.
2. Select a date search criteria radio button, *or* click **Don't Care** if you don't want to set any date search criteria.
3. If you select **Use Above Information**, follow these steps.
   - Enter the starting date and time in the **From** field including the "AM" or "PM" designation.
   - Enter the ending date and time in the **To** fields field including the "AM" or "PM" designation.
4. Click **OK**.

Setting Status Search Criteria—Steps:
To set the accept, reject, and undetermined status search criteria, complete the following steps.

1. To include samples with the Accept status, check the **Accept** check box.
2. To include samples with the Reject status, check the **Reject** check box.
3. To include samples with the Undetermined status, check the **Undetermined** check box.

Setting Tags Search Criteria—Steps:
To enter or edit the tags search criteria, complete the following steps.

1. Click the arrow button for the type of tags search criteria (**OR Tags**, **AND Tags**, or **NOT Tags**). This opens the Select Tags dialog.
2. To include a tag in the search criteria, highlight it in the **Available Tags** list and click the **Include** button.
3. To remove a tag from the search criteria, highlight it in the **Selected Tags** list and click the **Remove** button.
4. To create a new tag for the search criteria, click the **Create…** button. Refer to the Create/Edit a Tag sub-section.
5. Click **OK**.

Saving the Filter Search Criteria—Steps:
To save a new filter or an edited filter, simply click the **OK** button in the Filter Builder dialog when all the filter's search criteria is correct.

Deleting a Filter—Steps:
To delete a filter, complete the following steps.

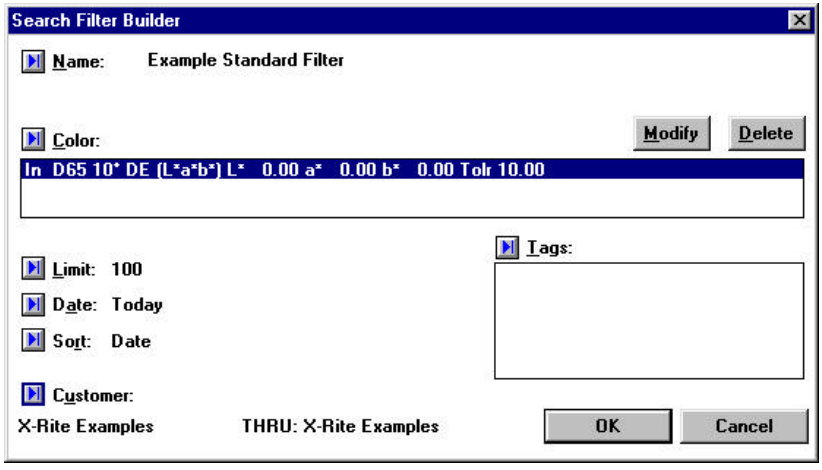
1. In the Select Filter dialog, highlight the filter to be deleted.
2. Click the **Delete…** button.
3. Click the **Yes** button if you are sure you want to delete the filter. Click the **NO** button if you do not want to delete the filter.

Create, Edit, or Delete a Standard Filter
Creating and editing standard filters is done in the Search Filter Builder dialog. This dialog contains the following items.

- **Name** - This arrow button allows you to name the filter.
- **Color** - This arrow button opens the Color Search Criteria so you can specify the search criteria for color data. You can also paste or measure target color data in this dialog. The color data appears in the field.
- **Limit** - This arrow button opens the Limit Search Criteria so you can specify the maximum number of standards selected with the filter. The limit appears in the field.
- **Date** - This arrow button opens the Date Search Criteria so you can specify the date range of the standards selected by the filter. The **Today** radio button selects the standards measured today. The **This**

Week radio button selects the standards measured this week. The **This Month** radio button selects the standards measured this month. The **This Year** radio button selects the standards measured this year. The **Use Above Information** radio button selects the standards measured during the date and time range specified in the **From** and **To** fields. The date and time search criteria appears in the field.

- **Sort** - This arrow button opens the Sort Search Criteria so you can select a sorting method. The sort method appears in the field.
- **Customer** - This arrow button opens the Customer Search Criteria dialog which allows you to specify a range of customers to include in the search criteria.
- **Tags** - This arrow button opens the Select Tags dialog which allows you to select tags to include in the **Tags** list. Tags search criteria only selects standards whose tags exactly match the tags in the **Tags** list.



Opening the Search Filter Builder Dialog—Steps:

To open the Search Filter Builder dialog to create or edit a Standard Filter, complete the following steps.

1. Select the **Standard Filters…** function in the **Edit Filters** pop up window from the **Database** menu. This opens the Standard Search Definition dialog.
2. Choose to create or edit a Standard Filter:
   - To create a Standard Filter, click the **Create…** button. This opens the Search Filter Builder dialog.

- To edit an existing Standard Filter, highlight the filter you want to edit and click the **Edit…** button. This displays the filter's search criteria in the Search Filter Builder dialog.

Naming Your Standard Filter—Steps:
To enter or edit the Standard Filter name, complete the following steps.

1. Click the **Name** arrow button. This opens the Name Search Criteria dialog.
2. Enter or edit the name in the **Name** field.
3. Click **OK**.

Setting Color Search Criteria—Steps:
To *enter* color search criteria, complete the following steps.

1. Click the **Color** arrow button. This displays the Color Search Criteria dialog.
2. Select the type of color data from the **Type** drop down list.
3. Select the illuminant/observer from the **Illum/Obs** drop down list.
4. Select the tolerance method from the **Tolerance** drop down list.
5. If the tolerance method is either **DE (L*a*b*)** or **DE (CMC 2:1)**, enter the Delta E tolerance in the **DE (method)** field.
6. Enter the target values in the **Target** fields, *or* click the **Paste** button to paste target values in the **Target** fields, *or* click the **Measure…** button and follow the screen prompts to measure in target values in the **Target** fields. For more information about pasting, refer to Section Seven—Maintaining Your Color Data.
7. If the tolerance method is **DL*Da*Db*** or **DL*DC*DH***, enter the tolerance values in the **Tolerance** fields.
8. *For spherical instruments only*, select the specular search method (included or excluded) by clicking the **Included** or **Excluded** radio button.
9. Click **OK**.

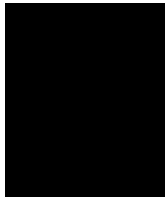
To *edit* color search criteria, complete the following steps.

1. Highlight the color search criteria you want to edit.
2. Click the **Modify** button or double-click on the color search criteria itself. The Color Search Criteria dialog appears.
3. Edit any of the search criteria in the same manner as creating search criteria.

4. Click **OK**.

To *delete* color search criteria, complete the following steps.

1. Highlight the color search criteria you want to delete.
2. Click the **Delete** button.



Setting the Filter Limit—Steps:
To enter or edit the limit for the filter, complete the following steps.

1. Click the **Limit** arrow button. This opens the Limit Search Criteria dialog.
2. Enter or edit the maximum number of standards to select, *or* click **Don't Care** if you don't want to set a maximum number.
3. Click **OK**.

Setting Date Search Criteria—Steps:
To enter or edit the date search criteria, complete the following steps.

1. Click the **Date** arrow button. This opens the Date Search Criteria dialog.
2. Select a date search criteria radio button, *or* click **Don't Care** if you don't want to set any date search criteria.
3. If you select **Use Above Information**, follow these steps.
   - Enter the starting date and time in the **From** field including the "AM" or "PM" designation.
   - Enter the ending date and time in the **To** fields field including the "AM" or "PM" designation.
4. Click **OK**.

Setting Sort Search Criteria—Steps:
To set the sort search criteria, complete the following steps.

1. Click the **Sort** arrow button. This opens the Sort Search Criteria dialog.
2. Select a sort method from the **Sort by** drop down list.
3. Click **OK**.

Setting Customer Search Criteria—Steps:
To set the customer search criteria, complete the following steps.

1. Click the **Customer** arrow button. This opens the Customer Search Criteria dialog.
2. Select a starting customer from the **From** drop down list, *or* click **Don't Care** if you don't want to exclude any customers from the search. (Customers are listed and searched in alphabetical order.)
3. Select an ending customer from the **To** drop down list.
4. Click **OK**.

Setting Tags Search Criteria—Steps:
To enter or edit the tags search criteria, complete the following steps.

1. Click the **Tags** arrow button. This opens the Select Tags dialog.
2. To include a tag in the search criteria, highlight it in the **Available Tags** list and click the **Include** button.
3. To remove a tag from the search criteria, highlight it in the **Selected Tags** list and click the **Remove** button.
4. To create a new tag for the search criteria, click the **Create…** button. Refer to the Create/Edit a Tag sub-section.
5. Click **OK**.

Saving the Filter Search Criteria—Steps:
To save a new filter or an edited filter, simply click the **OK** button in the Search Filter Builder dialog when all the filter's search criteria is correct.

Deleting a Filter—Steps:
To delete a filter, complete the following steps.

1. In the Select Filter dialog, highlight the filter to be deleted.
2. Click the **Delete…** button.
3. Click the **Yes** button if you are sure you want to delete the filter. Click the **NO** button if you do not want to delete the filter.

Create, Edit, or Delete an Ink Filter
Creating and editing ink filters is done by selecting ink tags in the Ink Filter Builder dialog. Refer to the Advanced Ink Selection Methods sub-section for using ink filters. Refer to the Creating Tags sub-section for creating ink tags.

The Ink Filter Builder dialog contains the following items.

- **Name** - This arrow button allows you to name the filter.
- **OR Tags** - This arrow button opens the Select Tags dialog which allows you to select ink tags to include in the **OR Tags** list. OR Tags search criteria selects inks that match one or more of the tags in the **OR Tags** list.
- **AND Tags** - This arrow button opens the Select Tags dialog which allows you to select ink tags to include in the **AND Tags** list. AND Tags search criteria only selects inks whose tags include all of the ink tags in the **AND Tags** list.

- **NOT Tags** - This arrow button opens the Select Tags dialog which allows you to select ink tags to include in the **NOT Tags** list. NOT Tags search criteria *does not* select inks whose tags match any ink tags in the **NOT Tags** list.

Opening the Ink Filter Builder Dialog—Steps:
To open the Ink Filter Builder dialog to create or edit an Ink Filter, complete the following steps.

1. Select the **Ink Filters…** function in the **Edit Filters** pop up window from the **Database** menu. This opens the Filters dialog.
2. Choose to create or edit an Ink Filter:
   - To create an Ink Filter, click the **Create…** button. This opens the Ink Filter Builder dialog.
   - To edit an existing Ink Filter, highlight the filter you want to edit and click the **Edit…** button. This opens the filter's search criteria in the Ink Filter Builder dialog.

Naming Your Ink Filter—Steps:
To enter or edit the Ink Filter name, complete the following steps.

1. Click the **Name** arrow button. This opens the Name Search Criteria dialog.
2. Enter or edit the name in the **Name** field.
3. Click **OK**.

Setting Tags Search Criteria—Steps:
To enter or edit the tags search criteria, complete the following steps.

1. Click the arrow button for the type of tags search **criteria (OR Tags**, **AND Tags**, or **NOT Tags**). This opens the Select Tags dialog.
2. To include a tag in the search criteria, highlight it in the **Available Tags** list and click the **Include** button.

3. To remove a tag from the search criteria, highlight it in the **Selected Tags** list and click the **Remove** button.
4. To create a new tag for the search criteria, click the **Create…** button. Refer to the Create/Edit a Tag sub-section.
5. Click **OK**.

Saving the Filter Search Criteria—Steps:
To save a new filter or an edited filter, simply click the **OK** button in the Ink Filter Builder dialog when all the filter's search criteria is correct.

Deleting a Filter—Steps:
To delete a filter, complete the following steps.

1. In the Select Filter dialog, highlight the filter to be deleted.
2. Click the **Delete…** button.
3. Click the **Yes** button if you are sure you want to delete the filter. Click the **NO** button if you do not want to delete the filter.

CREATING TAGS

Ink-Master provides a simple way to group important characteristics about inks, standards, formulas, and samples by *attaching* tags to them. Ink-Master offers two types of tags, Ink Tags and General Tags. Ink Tags are used only with inks, whereas General Tags can be used with standards, formulas, and samples. The software provides several basic tags for each type of tag, *and* it also allows you to create, edit, and delete tags.

Ink Tags

Ink Tags are used to group inks together by any important characteristic. Ink tag "maintenance"—creating, editing, and deleting—allows you to establish ink tags, change ink tags, and remove ink tags from your database. (If you are selecting tags for an ink, the Select Tag dialog may also contain a **Create…** button that opens the Create Tag dialog.)

Steps:
To attach an ink tag, complete the following steps.

1. Click a "Tags" arrow button. This opens the **Select Tags** dialog.
2. Highlight the tag you want to attach in the **Available Tags** list box.

3. Click the **Include** button. Repeat steps 2 and 3 for each tag you want to attach to the item. (To remove a tag, highlight it in the **Selected Tags** list box and click the **Remove** button.)
4. Click the **OK** button.

Steps:
To create a new ink tag, complete the following steps.

1. Select the **Ink Tags…** function in the **Edit Tags** pop up window from the **Database** menu. This opens the Edit Ink Tags dialog.
2. Click the **Create…** button. This opens the Create Tag dialog.
3. Enter the tag in the field.
4. If you want to create another new ink tag without closing the Edit Ink Tags dialog, check the **Repeat** check box.
5. Click the **OK** button.

Steps:
To edit an existing ink tag, complete the following steps.

1. Select the **Ink Tags…** function in the **Edit Tags** pop up window from the **Database** menu. This opens the Edit Ink Tags dialog.
2. Click the **Edit…** button. This opens the Edit Tag dialog.
3. Edit the tag in the field.
4. Click the **OK** button. The ink tag is added to your database.

Steps:
To delete an existing ink tag, complete the following steps.

1. Select the **Ink Tags…** function in the **Edit Tags** pop up window from the **Database** menu.
2. Click the **Delete…** button. This opens the Delete Tag dialog.
3. Click the **OK** button.

General Tags

A General Tag is used to group items (standards, formulas, or samples) together by an important characteristic. General tag “maintenance”—creating, editing, and deleting—allows you to establish general tags, change general tags, and remove general tags from your database. (If you are selecting tags for an item, the Select Tag dialog may also contain a **Create…** button that opens the Create Tag dialog.)

Steps:
To attach a general tag, complete the following steps.

1. Click a “Tags” arrow button. This opens the Select Tags dialog.
2. Highlight the tag you want to attach in the **Available Tags** list box.
3. Click the **Include** button. Repeat step **2** and **3** for each tag you want to attach to the item. (To remove a tag, highlight it in the **Selected Tags** list box and click the **Remove** button.)
4. Click the **OK** button.

Steps:
To create a new general tag, complete the following steps.

1. Select the **General Tags…** function in the **Edit Tags** pop up window from the **Database** menu. This opens the Edit Ink Tags dialog.
2. Click the **Create…** button. This opens the Create Tag dialog.
3. Enter the tag in the field.
4. If you want to create another new general tag without closing the Edit Ink Tags dialog, check the **Repeat** check box.
5. Click the **OK** button.

Steps:
To edit an existing general tag, complete the following steps.

1. Select the **General Tags…** function in the **Edit Tags** pop up window from the **Database** menu. This opens the Edit Ink Tags dialog.
2. Click the **Edit…** button. This opens the Edit Tag dialog.
3. Edit the tag in the field.
4. Click the **OK** button.

Steps:
To delete an existing general tag, complete the following steps.

1. Select the **General Tags…** function in the **Edit Tags** pop up window from the **Database** menu.
2. Click the **Delete…** button. This opens the Delete Tag dialog.
3. Click the **OK** button.

USING LOT IDs

Lot IDs provide a method of locating specific samples. Ink-Master allows you to attach Lot IDs to samples then provides a means of searching for samples according to Lot ID.

Create/Edit a Lot ID

A Lot ID is attached to a sample either through the Controls window or when uploading a standard from a spherical instrument. Refer to Section Eight—Managing Your Data for assigning Lot IDs when uploading standards.

Steps:

To attach a Lot ID to a sample (or edit a Lot ID) through the Controls window, complete the following steps.

1. Use the **Sample** scroll bar to select the desired sample.
2. Enter or edit the Lot ID in the **Lot ID** entry field.
3. Repeat steps 1 and 2 to attach (or edit) a Lot ID to all desired samples.

Use Lot ID to Find a Sample

Samples with Lot IDs can be searched for within the selected standard or across all standards in the database.

Steps:

To find a sample according to a Lot ID, complete the following steps.

1. Select the **Find Lot ID…** function from the **Database** pull down menu, *or* click the **Lot ID** arrow button in the Controls window. This opens the Find Lot ID dialog.
2. Enter the Lot ID in the **Lot ID** entry field. If you do not enter a Lot ID, all samples without a Lot ID are retrieved.
3. If you want to search across all standards, check the **Across Standard** check box.
4. Click the **Find** button. The standard with the matching Lot ID is displayed in the application.
5. If more than one sample is found with the above determined Lot ID (or lack of), this opens the Find Lot ID Results dialog which lists the standard, the customer, and the date for each sample found. Select the desired sample from the list box and click the **Select** button. The standard is displayed in the application.

Use Lot ID to Find a Standard

Ink-Master allows you to search for a standard by a Lot ID. If you do not enter a Lot ID, Ink-Master will find *all* the standards *without* Lot IDs. Refer to Section Ten—Advanced Software Features for more information on Lot ID's. *You must search for the Lot ID across all standards.*

Steps:

To find a standard by Lot ID, complete the following steps.

1. Select the **Find Lot ID…** function from the **Database** menu. This opens the Find Lot ID dialog.
2. Enter the Lot ID in the **Lot ID** entry field.
3. Check the **Across Standards** to search across all the standards.
4. Click the **Find…** button. This opens the Find Lot ID Results dialog which displays the standards that match the Lot ID.
5. Highlight the desired standard.
6. Click the **Select** button.

ALTERNATE ENTRY METHODS

The **Alternate Entry…** button available on some of the measurement dialogs opens the Alternate Reflectance Entry dialog. This dialog allows you to select a different method for entering a color's reflectance data. The available Alternate Entry methods are listed below.

- **Manually (keyboard)** - manually entering the reflectance data.
- **Current Sample** - (*standards only*) using the current sample's color data.
- **Average the Current Set** - (*standards only*) averaging the current set of samples.
- **Paste From Clipboard** - pasting data in from the clipboard.
- **Contrast Ratio** - measuring a color's contrast ratio data.

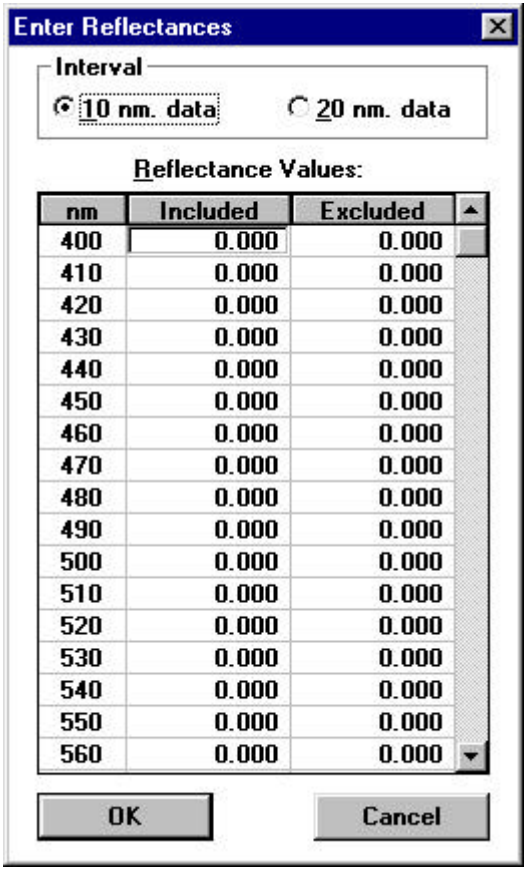
Steps:

To select an alternate entry method, complete the steps below.

1. Click the radio button next to the method you want to use.
2. Click the **OK** button. This either opens a dialog for the alternate entry method (**Manually**, **Contrast Ratio**), or it enters the color data in the appropriate measurement dialog (**Current Sample**, **Average the Current Set**, **Paste From Clipboard**).

Manually (keyboard)

When selected, the **Manually (keyboard)** radio button opens the Enter Reflectances dialog. You can enter the reflectance values for a color from 400 nm to 700 nm in 10 nm or 20 nm intervals. (Included and Excluded values may be entered for spherical instruments.)



Steps:

To enter reflectance values with the keyboard, complete the following steps.

1. Select either the **10 nm. data** or **20 nm. data** interval radio button.
2. Enter the reflectance values for the color into the appropriate column(s) in the table. You can not edit the **nm** column.

3. Click the **OK** button when all the data is entered.

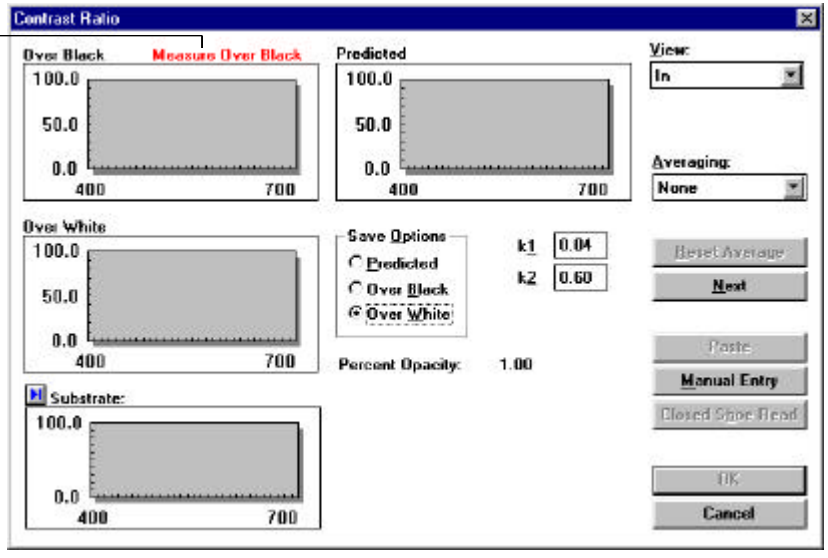
Contrast Ratio

The Contrast Ratio method provides a way to determine the opacity of an ink. These measurements are done in the Contrast Ratio dialog. This measurement dialog contains the following items *in addition* to the Over Black/Over White measurement dialog. Refer to Section Seven—Basic Techniques.

- **Predicted** graph - displays the predicted reflectance values for the color if it was 100% opaque.
- **Save Options:**
  - **Predicted** radio button - saves the predicted color data.
  - **Over Black** radio button - saves the Over Black color data.
  - **Over White** radio button - saves the Over White color data. This radio button is selected by default.
- **k1** and **k2** fields - default to the calibration set values. It is *not* recommended to edit these values. See the Create/Edit a Calibration Set sub-section. These values are automatically adjusted to equal the values from the calibration set.

NOTE: You *can not* edit the substrate for a trial.

Measurement prompt in red text.



Steps:
To measure the opacity of an ink, complete the following steps.

1. *For spherical instruments only*, select **In** (included) or **Ex** (excluded) from the **View** method drop down list.
2. Select your averaging method from the **Averaging** method drop down list.
3. Select the desired save option radio button, **Predicted**, **Over Black**, or **Over White**.
4. Follow the red text prompts and take your measurement(s).
5. If you want to paste color data into the graph that has focus, click the **Paste** button.
6. If you want to manually enter the color data, click the **Manual Entry** button. Refer to the Manually (Keyboard) sub-section for instructions.
7. *For standards only*. If you want to retrieve substrate color data, click the **Substrate** arrow button, highlight a substrate from the list, and click the **Select…** button.
8. Click the **OK** button. The opacity is automatically entered into the Note.

ALTERNATE STANDARDS

Ink-Master allows you to use alternate standard descriptions to save different standards that share the same standard name. An alternate description then implies that the standard is then saved as an "alternate standard." Many alternate standards may exist for one standard name. This proves useful for a standard on several types of substrates.

Creating an Alternate Standard

If prompted to replace an existing standard with a new standard and you choose not to replace it, you can save the new standard under the same name as the existing standard with an *alternate* description.

Steps:
To assign an alternate standard description to the new standard, complete the following steps.

1. When prompted if you want to save the new standard under an alternate description, click the **Yes** button. This opens the Standard Description dialog.
2. Enter a description to assign to the new standard in the field.

3. Click the **OK** button.

Selecting an Alternate Standard

Standards are selected in either the Find Standard dialog or the Standard Maintenance dialog. (Alternate standards appear the same in both dialogs.) Standards are listed in the **Standards** list box and are indicated by a blue box icon.

If the box is empty, the standard has no samples associated to it. If the box is full of "papers," the standard has samples associated to it. If the box has a plus sign on it, the standard has alternate standards that are hidden. If the box has a minus sign on it, the alternate standards (descriptions) are displayed below the standard name. Alternate standards are represented by a gray box and the alternate description. The selected alternate standard is indicated by a red check mark. See below for an example.

12.5% Blue
Contrast Ratio
Over White only
2 Blue 50 Red 25 White OW
6.25 Y - 50 W - OW
"Papers" indicate samples attached to the standard.
Selected Alternate Standard for 12.5% Blue

Steps:

To select an alternate standard, complete the following steps. ***Short-cut:*** *Simply select an alternate standard from the* ***Standard Description*** *drop down list in the Controls window.*

1. In either the Find Standard dialog or the Standard Maintenance dialog, highlight the desired standard (with a plus sign on it's box icon) in the **Standards** list box.
2. Double click on the standard. This displays the hidden alternate standards.
3. Highlight the alternate standard you want to select and click the **Select** button; *or* simply double click on it.

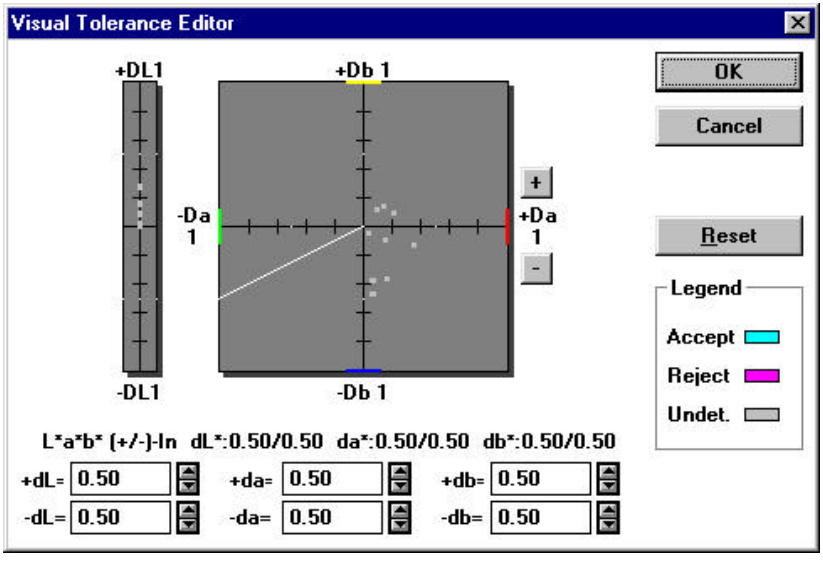
VISUALLY EDITING TOLERANCES

This feature allows a tolerance to be adjusted to agree with your customer's visual judgments. Accept/Reject/Undetermined status (based on tolerances) should be properly assigned through the Control window to all standards under consideration. Refer to Section Seven—Basic Techniques for more information about assigning Accept/Reject/Undetermined status.
Tolerances can be visually edited in the Visual Tolerance Editor dialog

only *for a standard with existing samples*. For more information about tolerances, refer to Section Six—Formulating.

Visual tolerancing is only available for the following types of tolerances: **L*a*b***, **L*C*H***, **CMC**, **Delta E**, **L*a*b* (+/)**, and **DE (FMC2)**. The Visual Tolerance Editor dialog contains the following information.

- **L*a*b* graph** - This graph displays the standard and all its samples highlighted with their appropriate Accept/Reject status. The graph changes as you change your tolerance limits.
- The selected tolerance information is displayed below the graph.
- Limit entry fields display the limits for the selected tolerance. Each field has an up arrow button and a down arrow button to adjust the limits.
- **Legend** - This area displays the color "coding" for the Accept/Rejects statuses: Accept (cyan), Reject (magenta), and Undetermined (gray).
- **Reset** - This button resets all limits to their original values.
- **OK** - This button accepts the changes and closes the Visual Tolerance Editor dialog.
- **Cancel** - This button *does not* accept the changes and closes the Visual Tolerance Editor dialog.



Steps:
To edit tolerances visually, complete the following steps.

1. Highlight the tolerance you want to edit.
2. Click the **Edit Tolerance Visually…** button. This opens the Visual Tolerance Editor dialog.
3. Enter new tolerance limits in the entry fields *or* click on the up or down arrow buttons to adjust the tolerance limits.
4. Click the **OK** button to save your changes.

ADVANCED INK SELECTION METHODS

Using an Ink Filter

An Ink Filter allows you to select a set of inks that share the common parameters of the filter's search criteria—ink tags. Refer to the Creating Filters sub-section for creating, editing, or deleting ink filters.

Steps:

To select inks using an Ink Filter, complete the following steps.

1. Select the **Available** arrow button in the Select Inks dialog, *or* select the **Ink Filters…** function in the **Edit Filters** pop up window from the **Database** menu. This opens the Filters dialog.
2. Highlight the filter you want to select.
3. Click the **Select** button.

Using Ink Sets

Ink sets allow you to save commonly used lists of inks for formulation. These sets are assigned a name. Ink sets are saved and retrieved through the formulation Select Inks dialog only.

Steps:

To save an ink set, complete the following steps.

1. In the Select Inks dialog, select the inks you want to save just as you would select the inks for a formula.
2. Click the **Save…** button. This opens the Ink Sets dialog.
3. Enter the name for the Ink set in the **Name** entry field.
4. Click the **OK** button.

Steps:

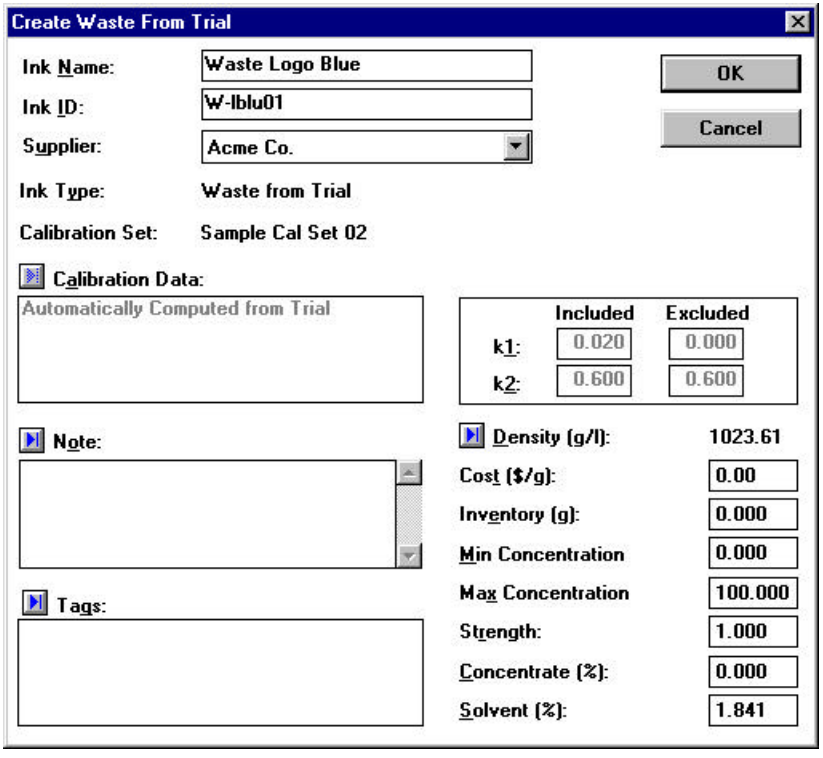
To retrieve an ink set, complete the following steps.

1. In the Select Inks dialog, click the **Load…** button. This opens the Ink Sets dialog.

2. From the **Existing Ink Sets** list box, select the ink set you want to load.
3. Click the **OK** button. The ink set is loaded into the **Selected** list box of the Select Inks dialog.

RECYCLING WASTE INK

Ink-Master allows you to use waste ink that is left over from a trial. This acts as a cost savings since the waste ink can then be used in future formulas. Ink-Master also allows you to edit some of the ink information, although, you *can not* edit the calibration data for a waste ink.



Steps:
To create a waste ink from a trial, complete the following steps.

1. In the Controls window, use the **Sample** scroll bar to select the trial you want to use.

2. Select the **Waste From Trial…** function from the **Database** menu. This opens Create Waste From Trial dialog.
3. Enter the ink's name in the **Ink Name** dialog.
4. Enter the ink ID in the **Ink ID** field.
5. Select the ink supplier from the **Supplier** drop down list.
6. Enter or edit the Density information. Click the **Density** arrow button. Choose the units and enter the mass and the unit volume. The density is always displayed in the default units. Refer to Section Four—Software Setup Options. Click **OK**.
7. Enter or edit the cost in the **Cost** field. The cost is always displayed with default units. Refer to Section Four—Setting Up Your Software.
8. Enter or edit the inventory information in the **Inventory** field. The inventory is always displayed in the default units. Refer to Section Four—Setting Up Your Software.
9. Enter or edit the minimum ink concentration in the **Min Concentration (%)** field.
10. Enter or edit the maximum ink concentration in the **Max Concentration (%)** field.
11. Enter or edit the calibration set's substrate strength in the **Strength** field.
12. If necessary, enter or edit the percentage of concentrate in the ink in the **Concentrate (%)** field.
13. If necessary, enter or edit the percentage of solvent in the ink in the **Solvent (%)** field.
14. Click the **Note** arrow button to enter any notes in the Note Editor. Refer to Section Seven—Basic Techniques.
15. Click the **Tags** arrow button to assign tags to the calibration set. Refer to the Creating Tags sub-section.
16. Click the **OK** button.

FORMULATING A SERIES OF MATCHES

Ink-Master allows you to formulate a series of matches. This is possible with the use of two queues: **Request Queue** and **Results Queue**. The Request Queue allows you to queue up a series of matches to formulate. The Results Queue allows you to view the matches that have been formulated through the Request Queue. This sub-section describes how to queue up a series of matches, formulate a series of matches from queue, and view the results.

Queue Up Your Matches

To formulate a series of matches, you must first queue up the matches you want to formulate. Matches are queued up in the Request Queue from the Combinatorial Formulation dialog. Refer to Section Six—Formulating.

Steps:

To queue up a match to formulate, complete the following steps.

1. Set the formula conditions in the Combinatorial Formulation dialog. Refer to Section Six—Formulating.
2. Click the **Add to Queue** button. This adds the match information to the Request Queue.
3. Repeat steps 1 and 2 for each match you want to queue up.

Formulate from Queue

Once you queue up the matches you want to formulate, you can then choose to formulate one or all the matches in the Request Queue. For each match queued to formulate, the Formulation Request Queue dialog lists the customer, the standard, and the time and date it was added to the queue. This dialog allows you to formulate one match from the queue, to formulate all matches in the queue, and to delete a match from the queue.

When a match or matches are formulating, the Combinatorial Formulation from Queue dialog appears. This dialog contains the same functions as the Combinatorial Formulation dialog. Refer to Section Six—Formulating. Once formulation is complete, the Formulate from Queue dialog appears with formula information, such as the errors that occurred during formulation and how many matches were made.

EXTRA FEATURE: If any matches are in the Request Queue while exiting the Ink-Master software, you are prompted to determine whether or not to formulate the items in the queue. Simply complete these steps.

1. Click the **Yes** button to formulate. This opens the Request Queue. (Click the **No** button to exit the software. All items in the Request Queue are unaffected.)

2. Choose to formulate one or all matches. Follow step 2 below.

Steps:

To formulate matches from the Request Queue, complete the following steps.

1. Open the Request Queue.
   - In the Combinatorial Formulation dialog, click the **Request Queue** arrow button. *OR…*
   - Select the **Request Queue** item in the **Manage Queue** pop up menu from the **Formulation** menu.
2. Choose to formulate one or all matches.
   - *To formulate one match*, highlight the match you want to formulate, click the **Formulate…** button. This opens the Combinatorial Formulation from Queue dialog and begins the formulate process.
   - *To formulate all matches*, click the **Formulate All…** button. This opens the Combinatorial Formulation from Queue dialog and begins the formulate process.
3. To delete a match from the Request Queue, simply highlight it and click the **Delete** button.

View Your Results

After formulation from queue is complete, you may view your results. (You may only view one formulation match at a time.) The Results Queue stores the matches formulated from queue and allows you to select the formula results to view. This is done in the Formulation Results Queue dialog. This dialog also allows you to delete a formulated match.

For each match formulated from queue, the Formulation Results Queue dialog lists the customer, the standard, and the time and date it was formulated. Viewing results is done in the Combinatorial Formulation dialog. Refer to Section Six—Formulating.

Steps:

To view a match formulated from queue, complete the following steps.

1. Open the Results Queue.
   - In the Combinatorial Formulation dialog, click the **Results Queue** arrow button. *OR…*
   - Select the **Results Queue** item in the **Manage Queue** pop up menu from the **Formulation** menu.
2. Highlight the formulated match you want to view.
3. Click the **View…** button. This opens the Combinatorial Formulation dialog. Refer to Section Six—Formulating.
4. To delete a formulated match from the Results Queue, simply highlight it in the Formulation Results Queue dialog and click the **Delete** button.

FORMULATING FROM A TRIAL

Ink-Master allows you to formulate a match from an actual trial. There are three steps to formulating from a trial: searching for the trial(s) to formulate from, viewing the formulation results, and accepting a match from a trial.

Searching for Trials

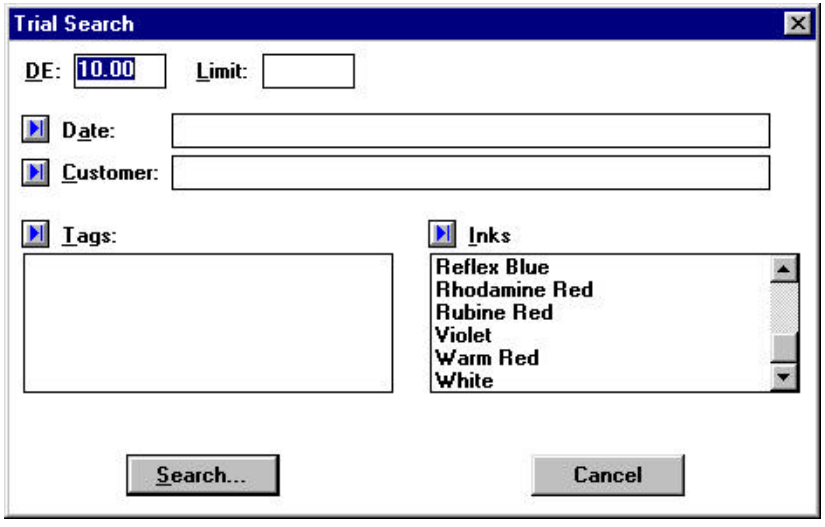
The first step to formulating from a trial is to search for the trial(s) to formulate matches. This is done in the Trial Search dialog. This dialog allows you to determine the search criteria and contains the following items.

- **DE** - This field allows you to set the maximum delta E trial values for the currently selected standard.
- **Limit** - This field allows you to set the maximum number of trials retrieved from the trial search.
- **Date** - This field displays the date range for the trial search. The arrow button opens the Date Search Criteria dialog which allows you to determine the date range for the trial search. The **Today** radio button selects the samples measured today. The **This Week** radio button selects the samples measured this week. The **This Month** radio button selects the samples measured this month. The **This Year** radio button selects the samples measured this year. The **Use Above Information** radio button selects the samples measured during the date range specified in the **From** and **To** fields. The date search criteria appears in the field.
- **Customer** - This arrow button opens the Customer Search Criteria dialog which allows you to specify a range of customers to include in the search criteria.
- **Tags** - This arrow button opens the Select Tags dialog which allows you to determine tags for the trial search criteria. Refer to the Creating Tags sub-section.
- **Inks** - This arrow button opens the Select Inks dialog which allows you to select the inks for formulating from a trial. The **Calibration Sets** list box lists all the calibration sets. The **Available** list box lists all the inks for the highlighted calibration set. The **Selected** list box lists all the inks selected for the trial search. The **Include>** button moves the highlighted ink in the **Available** list box to the **Selected** list box. The **<Remove** button moves the highlighted ink in the **Selected** list box to the **Available** list box. The "**All**" buttons move

all the inks from one list box to another. Refer to the Advanced Ink Selection sub-section for more information about the **Save** and **Load** buttons.

- **Search…** - This button searches for the trials within the search criteria and *automatically* formulates matches to these trials in the Formulate From Trial dialog.
- **Cancel** - This button cancels the search and closes the Trial Search dialog.

NOTE: Trial search criteria also may be set from within the Formulate From Trial dialog by clicking the **Search Criteria** arrow button.



Steps:
To determine the trial search criteria, complete the following steps.

1. Select the **From Trial…** function from the **Formulate** pull down menu. This opens the Trial Search dialog.
2. Enter the search delta E in the **DE** field.
3. Enter the maximum amount of trials retrieved in the **Limit** field.
4. Click the **Date** arrow button. This open the Date Search Criteria dialog.
   - Select a date search criteria radio button, *or* click **Don't Care** if you don't want to set any date search criteria.
   - If you select **Use Above Information**, follow these steps.

- Enter the starting date and time in the **From** field including the “AM” or “PM” designation.
- Enter the ending date and time in the **To** fields field including the “AM” or “PM” designation.

- Click the **OK** button. This returns to the Trial Search dialog.

5. Click the **Customer** arrow button. This opens the Customer Search Criteria dialog.
   - Select a starting customer from the **From** drop down list, *or* click **Don’t Care** if you don’t want to set any customer search criteria. (Customers are listed and searched in alphabetical order.)
   - Select an ending customer from the **To** drop down list.
   - Click the **OK** button. This returns to the Trial Search dialog.
6. Click the **Tags** arrow button. This opens the Select Tags dialog.
   - To include a tag in the search criteria, highlight it in the **Available Tags** list and click the **Include** button.
   - To remove a tag from the search criteria, highlight it in the **Selected Tags** list and click the **Remove** button.
   - To create a new tag for the search criteria, click the **Create…** button. Refer to the Creating Tags sub-section.
   - Click the **OK** button. This returns to the Trial Search dialog.
7. Click the **Inks** button. This opens the Select Inks dialog.
   - In the **Calibration Sets** list box, highlight the calibration set that contains the inks you want to use. All of the inks in the calibration set appear in the **Available** list box.
   - Highlight the ink you want to select in the **Available** list box and click the **Include >** button to move it to the **Selected** list box. (To remove an ink from the **Selected** list box, highlight it and click the **Remove <** button.) Use the “**All**” buttons to move all of the inks from one list box to another.
   - Click the **OK** button. This returns to the Trial Search dialog.
8. Click the **Search…** button. This opens the Formulate From Trial dialog and *automatically* begins formulating matches from the trials retrieved from the trial search criteria. The number of formula combinations are displayed next to **Formula: Combinations**, and the closest matches are displayed beneath the **Sort Criteria**.
9. To stop the software from formulating, click the **Abort** button.

Viewing the Results

After the software has formulated ink matches in the Formulate From Trial dialog, you may view the results in both formula form and color data form. The formula is displayed in the formula display area below the **Substrate** information, and the color data is displayed in the lower right corner of the Formulate From Trial dialog. To edit the formula, refer to the Editing Formulas sub-section. For more information about other formula conditions, refer to Section Six—Formulating.

EXTRA FEATURE: Ink-Master allows you to repeat the trial search from *within* the Formulate From Trial dialog. Simply complete the following steps.

1. Click the **Search Criteria** arrow button to open the Trial Search dialog.
2. Set the search criteria according to the steps in the Searching For Trials sub-section..
3. Once the criteria is selected, click the **Search…** button to return to the Formulate From Trial dialog. (This *does not* automatically formulate matches from the trials retrieved.)
4. Click the **Formulate** button to formulate the trial matches from the new search criteria.

The formula display area lists the following types of data: correction factor —**cf** (if applicable), % Trial, % Match, and Ink Information. Below is a list of display options for the current trial match's color data.

- **Text** - This radio button lists the L*, a*, b*, C*, h*, DH, and DE values for the standard and the sample (match), as well as Delta values.
- **Reflectance** - This radio button displays the standard curve (in white) and the sample curve in either green (pass) or red (fail) on a reflectance graph.
- **L*a*b*** - This radio button displays the standard (in white) and the sample in either green (pass) or red (fail) on a L*a*b* graph.
- **Visual** - This radio button displays a visual representation of the standard and the sample.

Steps:

To view your formula results, complete the following steps.

1. In the list box below the **Sort Criteria**, highlight the formula you want to view.
2. To view the ink information for the formula, click the **Ink Info.** arrow button in the formula display area. This opens the Ink Information dialog.
3. To view the color data for the match, first select the illuminant/observer from the drop down list above the display area. *For spherical instruments only,* select either the **Included** radio button or the **Excluded** radio button for the data type. Then select the appropriate radio button to display the match's color data: **Text**, **Reflectance**, **L*a*b***, or **Visual**.

Accepting a Trial Formulation Match

If you want to accept a formula from trial, you may select it to be included in the standard's sample set and prepare the formula for use. To prepare a formula, Ink-Master allows you to view, modify, print, and export the formula's report. This is done in the New Formula Report dialog. This dialog contains the following items.

NOTE: All percentage units are determined by the selected calibration set. Refer to Section Five—Establishing Your Database. For information about amount defaults, refer to Section Four—Software Setup Options.

- **Calibration Set** - This shows the current calibration set used for the formula.
- **Lot ID** - This shows the Lot ID of the sample.
- **Substrate** - This shows the name of the substrate for the formula.
- **Scaled Amount <type of scaling>** - This arrow button opens the Edit Amount dialog where you enter the scaled amount. The scaled amount is displayed to the right of this item. The type of scaling is determined by the **Formula Scaling** radio button currently selected. The units drop down list allows you to select the units for the scaled amount.
- **Ink Display area** - This area lists the names of the inks in the formula as well as their percentages and amounts. The units drop down list in this area allows you to select the units for the ink amounts. If these units are changed, all other units in the dialog reflect this change. If an amount exceeds the inventory amount, it is indicated by a red asterisk with an "Exceeds Inventory Amount" note at the bottom of the dialog.

- **Ink Components** - These radio buttons determine the type of ink component used in the formula.
  - **Light** - This radio button indicates that only Light Inks are used in the formula. Light, press ready, inks are used as ingredients in the mixture.
  - **Heavy** - This radio button indicates that Heavy Inks plus solvent are used to create the press ready ink mixture.
  - **Concentrate** - This radio button indicates that Concentrate, extender, and solvent are combined to create the press ready ink mixture.
- **Formula Scaling** - These radio buttons determine the type of scaling is used to display the formula. The selected type of scaling is displayed in the **Scaled Amount**.
  - **Total** - This radio button indicates that the formula is scaled to the total amount of all the inks, the extender, and the solvent.
  - **Extender** - This radio button indicates that the formula is scaled to the amount of the extender only.
  - **Inks** - This radio button indicates that the formula is scaled to the total amount of the inks only.
- **Extender** - This display line shows the percentage and the amount of the extender in the formula. The units drop down list in this display line allows you to select the units for the extender amount.
- **Solvent** - This display line shows the percentage and the amount of the solvent in the formula. The units drop down list in this display line allows you to select the units for the solvent amount. This display line is *disabled* if the **Light** radio button is selected for the Ink Mixture type.
- **Total Amount** - This display line shows the percentage and the total amount of the formula. The units drop down list in this display line allows you to select the units for the total formula amount.
- **Cost of Batch** - This display line shows the cost of the batch.
- **Note** - This arrow button opens the Note Editor. The note is displayed in the note box.
- **Print** - This button allows you to print the formula report. If the **Auto Inventory** item is checked in the **Options** pull down menu, the Edit Inventory Amount dialog is displayed to allow you to edit the inventory amounts before the report is printed.
- **<Export>** - This button allows you to export the formula report (possibly to a dispenser). The name of this button is determined in the Formula Options function, as well as whether or not this function is enabled. Refer to Section Four—Software Setup Options.

- **Close** - This button closes the New Formula Report dialog.

Steps:
To accept a formula and prepare it to be used, complete the following steps.

1. In the list box below the **Sort Criteria**, highlight the formula you want to select.
2. Click the **Select** button in the Formulate From Trial dialog.
3. Click the **Report…** button. This opens the New Formula Report dialog.
4. Select the units for the inks.
5. Select the desired **Formula Scaling** radio button.
6. Click the **Scaled Amount** arrow button.
7. Enter the scaled amount and click **OK**.
8. Select the units for the scaled amount.
9. Select the applicable **Ink Components** radio button.
10. Select the units for the extender.
11. If available, select the units for the solvent.
12. Select the units for the total amount.
13. Click the **Note** arrow button to enter any notes in the Note Editor. Refer to Section Ten—Advanced Software Features.
14. If you want to print the report, click the **Print** button. If prompted, you may edit the inventory amounts (and units), then click **OK**.
15. If you want to export the report, click the **<Export>** button.
16. When finished with the report, click the **Close** button.

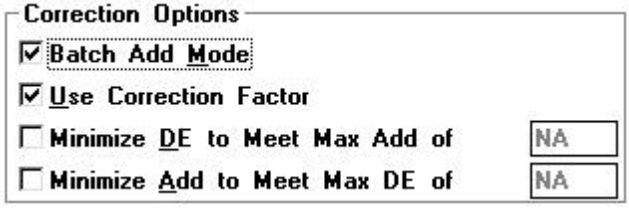
USING BATCH ADD MODE

If you are correcting a formula, Ink-Master allows you to perform a batch add correction. This determines “add amounts” for the formula you are correcting rather than creating a new formula for the corrections necessary. This batch add function is available as the **Batch Add Mode** check box in the Correction Options area of the Formulate for Correction dialog. Refer to Section Six—Formulating.

Batch Add Correction

When the **Batch Add Mode** check box is checked, two additional check boxes appear: **Minimize DE to Meet Max Add of** and **Minimize Add to Meet Max DE of**. (You may select either of these check boxes or neither, but you *can not* select both check boxes.) Each check box has a field in which you must enter the appropriate information. For the

Minimize DE to Meet Max Add of check box, you must enter the percentage value of a maximum add. For **Minimize Add to Meet Max DE of** the check box, you must enter a maximum delta E value for the batch add.



After a batch add correction is performed, formula information displayed in the formula display area lists the following type of data: correction factors—**cf**, Error amount, Add amount, Total amount, Total Add amount, and Ink Information.

Steps:

To perform a batch add mode correction, complete the following steps.

1. Check the **Batch Add Mode** check box. This displays two additional check boxes.
2. If desired, select *one* of the following batch add mode options.
   - *To minimize the batch add delta E to meet the maximum batch add*, check the **Minimize DE to Meet Max Add of** check box.
   - *To minimize the batch add to meet the maximum batch add delta E*, check the **Minimize Add to Meet DE of** check box.
3. Click the **Correct** button to correct the formula.
4. View your results. Refer to Section Six—Formulating.

Accepting a Batch Add Correction

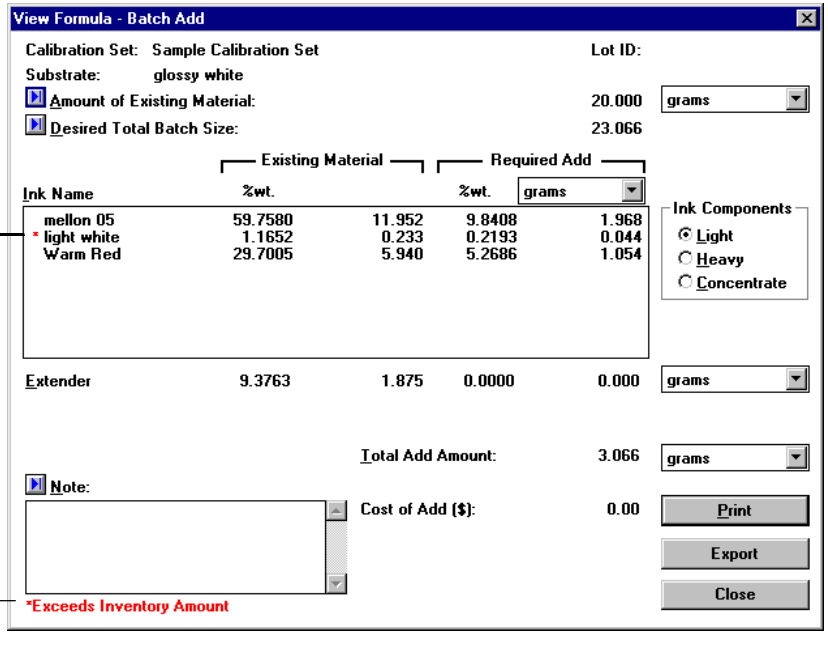
If you want to accept a batch add correction, you may select it to be included in the standard's sample set and prepare the formula for use. For preparing a formula, Ink-Master allows you to view, modify, print, and export the formula's report. This is done in the View Formula - Batch Add dialog. This dialog contains the following items.

NOTE: All percentage units are determined by the selected calibration set. Refer to Section Five—Establishing Your Database. For information about amount defaults, refer to Section Four—Software Setup Options.

- **Calibration Set** - This shows the current calibration set used for the formula.
- **Lot ID** - This shows the Lot ID.
- **Substrate** - This shows the name of the substrate for the formula.
- **Amount of Existing Material** - This arrow button opens the Edit Amount dialog where you enter the amount of existing material. The amount is displayed to the right of this item. The units drop down list allows you to select the units for the amount of existing material. **NOTE:** If these units are changed, all other units in the dialog reflect this change.
- **Desired Total Batch Size** - This arrow button opens the Edit Amount dialog where you enter the amount of existing material. The amount is displayed to the right of this item.
- **Ink Display area** - This area lists the names of the inks in the formula as well as their percentages and amounts of existing material *and* required add material. The units drop down list in this area allows you to select the units for the ink amounts. If an amount exceeds the inventory amount, it is indicated by a red asterisk with an "Exceeds Inventory Amount" note at the bottom of the dialog.
- **Ink Components** - These radio buttons determine the type of ink component used in the formula.
  - **Light** - This radio button indicates that only Light Inks are used in the formula. Light, press ready, inks are used as ingredients in the mixture.
  - **Heavy** - This radio button indicates that Heavy Inks plus solvent are used to create the press ready ink mixture.
  - **Concentrate** - This radio button indicates that Concentrate, extender, and solvent are combined to create the press ready ink mixture.
- **Extender** - This display line shows the percentage and the amount of the extender in the existing material *and* required add material. The units drop down list in this display line allows you to select the units for the extender amount.
- **Solvent** - This display line shows the percentage and the amount of the solvent in the existing material *and* required add material. The units drop down list in this display line allows you to select the units

for the solvent amount. This display line is *disabled* if the **Light** radio button is selected for the Ink Mixture type.

- **Total Add Amount** - This display line shows the total add amount for the batch add formula. The units drop down list in this display line allows you to select the units for the total formula amount.
- **Cost of Add ($)** - This display line shows the cost of the batch.
- **Note** - This arrow button opens the Note Editor. The note is displayed in the note box. Refer to Section Seven—Basic Techniques.
- **Print** - This button allows you to print the formula report. If the **Auto Inventory** item is checked in the **Options** pull down menu, the Edit Inventory Amount dialog is displayed to allow you to edit the inventory amounts before the report is printed.
- **<Export>** - This button allows you to export the formula report (possibly to a dispenser). The name of this button is determined in the Formula Options function, as well as whether or not this function is enabled. Refer to Section Four—Software Setup Options.
- **Close** - This button closes the View Formula - Batch Add dialog.



Red asterisk indicates that the ink exceeds the inventory amount.

Steps:

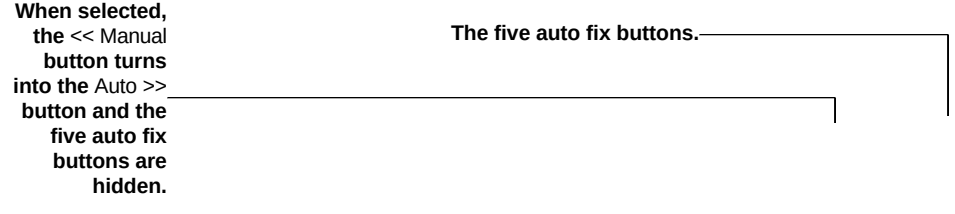
To accept a batch add correction formula and prepare it to be used, complete the following steps.

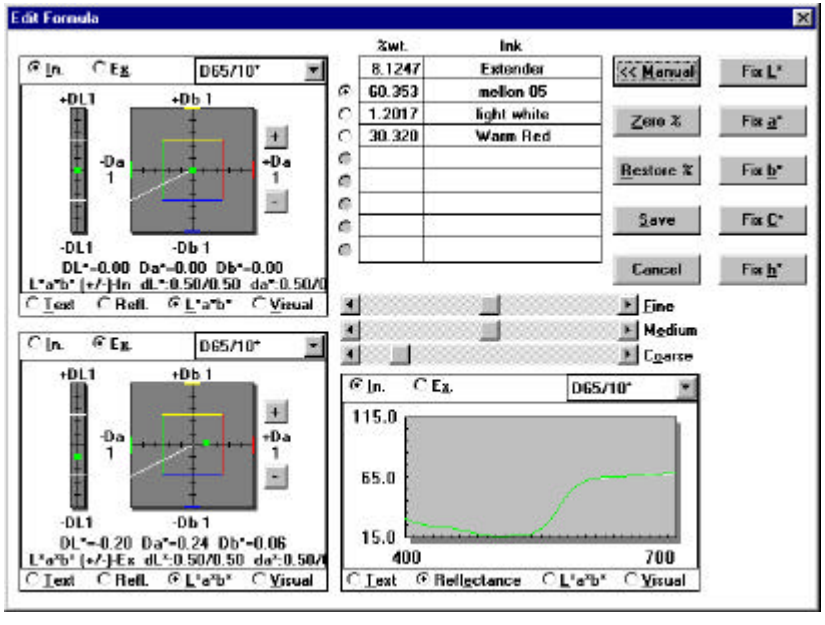
1. In the Formulate for Correction dialog, click the **Select** button.
2. Click the **Report…** button. This opens the View Formula - Batch Add dialog.
3. Select the units for the amount of existing material.
4. Click the **Amount of Existing Material** arrow button.
5. Enter the amount of existing material and click **OK**.
6. Click the **Desired Total Batch Size** arrow button.
7. Enter the amount of the total batch size and click **OK**.
8. Select the units for the inks.
9. Select the desired **Ink Components** radio button.
10. Select the units for the extender.
11. If available, select the units for the solvent.
12. Select the units for the total add amount.
13. Click the **Note** arrow button to enter any notes in the Note Editor. Refer to Section Seven—Basic Techniques.
14. If you want to print the report, click the **Print** button. If prompted, you may edit the inventory amounts (and units), then click **OK**.
15. If you want to export the report, click the **<Export>** button.
16. When finished with the report, click the **Close** button.

EDITING FORMULAS

Editing formulas gives the user the ability to adjust formula ink concentrations. This is done in the Edit Formula dialog. Two edit methods are available: Manual and Auto Fix.

NOTE: If performing a Batch Add correction, concentration level adjustments add to existing inks.





The Edit Formula dialog contains the following items.

- **display windows** - This dialog contains three display windows that can be set to display text data, reflectance data, L*a*b* data, or visual data under a selected illuminant/observer. The illuminant/observer is selected from the illuminant/observer drop down list. *For spherical instruments only*, specular included or excluded can be selected for each window by selecting the appropriate radio button. **NOTE:** All adjustments to the formula are reflected in every display window.
  - **Text** - This radio button displays the L*, a*, b*, C*, h°, DH, DE, and delta difference values for the standard and sample.
  - **Refl.** - This radio button displays the standard (white) and sample (green = pass; red = fail) reflectance curves.
  - **L*a*b*** - This radio button displays the selected sample (green = pass, red = fail) and standard in an L*a*b* color space graph. It lists the CMC tolerance, the Delta Difference, and the tolerance values. The **+** (plus) button increases the viewing scale and the **-** (minus) button decreases the viewing scale. The viewing scale ranges from 1 to 200 times (1, 2, 5, 10, 20, 100, and 200).
  - **Visual** - This radio button displays the color difference comparison between a sample and the standard. This window type

should be used for visual assessment only. The colors that are displayed do not exactly match the actual colors.

- **Ink percentage & Name radio button list** - This lists the ink percentage and name for each ink in the formula. Each ink is selected by its radio button.
- **Fine** - This scroll bar allows you to adjust the ink percent of the selected ink in fine increments.
- **Medium** - This scroll bar allows you to adjust the ink percent of the selected ink in medium increments.
- **Coarse** - This scroll bar allows you to adjust the ink percent of the selected ink in coarse increments.
- **Auto >>** - This button allows correction of hue, chroma or lightness on an identified L*, a*, b*, C*, or h° value. (**TIP:** Auto fix editing can also be used to minimize adds in situations where one ink is added with slight amounts of others. This is accomplished by zeroing all percentages, selecting the ink to be added, and fixing the desired value.) This button displays five auto fix buttons, and it changes to the **Manual <<** button (which, when selected, "hides" the five auto fix buttons).
  - **Fix L*** - This button fixes the L* attribute using the selected ink.
  - **Fix a*** - This button fixes the a* attribute using the selected ink.
  - **Fix b*** - This button fixes the b* attribute using the selected ink.
  - **Fix C*** - This button fixes the C* attribute using the selected ink.
  - **Fix h°** - This button fixes the h° attribute using the selected ink.
- **Zero %** - This button zeros all the ink percentages for the formula.
- **Restore %** - This button restores all the ink percentages to their original values before the Edit Formula dialog was opened.
- **Save** - This button saves the changes to the formula and closes the Edit Formula dialog.
- **Cancel** - This button closes the Edit Formula dialog *without* saving any changes to the formula.

Steps:

To manually edit the formula, complete the following steps.

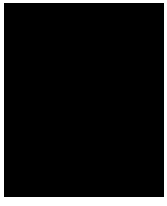
1. Click the **Formula** arrow button. This opens the Edit Formula dialog.
2. Define the three displays windows as you desire.
3. Click the radio button for the ink you want to adjust.
4. Use the **Fine** scroll bar, **Medium** scroll bar, and/or the **Coarse** scroll bar to adjust the ink percentage (or percent add for Batch

Add). **NOTE:** *Only* batch add correction formulas allow adjustment of the extender.

5. Repeat steps 3 and 4 for each ink you want to edit.
6. When the formula is edited to your satisfaction, click the **Save** button.

Steps:

To auto fix the formula, complete the following steps.



1. Click the **Formula** arrow button. This opens the Edit Formula dialog.
2. Define the three displays windows as you desire.
3. Click the **Auto >>** button. This displays the five auto fix buttons.
4. Click the radio button for the ink you want to adjust.
5. Click the auto fix button for the attribute you want to adjust.
6. Repeat steps 4 and 5 for each ink you want to edit.
7. When the formula is edited to your satisfaction, click the **Save** button.

APPENDIX A

Sample Preparation Guide

WHY DO I HAVE TO PREPARE AN INK DATABASE?

The computer, like the colorist, is only as good as the information with which it is provided. The computer needs to be educated about the inks and substrates that you use, just as you were when you first began to do color formulation work. The spectrophotometer and computer work together to develop color matches, just as the colorist's eyes and brain work together to formulate colors.

HOW PRECISE DO I NEED TO BE IN PREPARING THE DATA SET?

The computer needs to know how your inks will perform in a formula. To best determine this, each ink must be entered at various levels. The computer will expect that your input is completely accurate, therefore, you must prepare your data set with precision and accuracy.

WHAT WILL I GAIN BY CAREFUL PREPARATION OF THE DATA SET?

By following the instructions within this sample preparation guide and adapting the recommendations to your process, you should generate an accurate, predictable data set. The result of which will save you time and money by making you a more efficient colorist. Time spent now will pay off in the future.

IMPORTANT CONSIDERATIONS

When creating a data set, the most important considerations are that this data is repeatable and accurate. You should work to eliminate as many variables as possible. Repeatability and accuracy needs to be accomplished at the laboratory level and emulate production. Any loss of accuracy will be magnified when the computer predicts color matches. Remember “garbage in” usually results in “garbage out.”

Thus, as the colorist is responsible for the data set, you need to make some decisions about techniques and equipment in the creation of these ink displays. The accuracy of the data set in predicting formulations for your

production process relies upon the proper choices for inks, substrates, sample preparation tools, and techniques.

RECOMMENDATIONS FOR CREATING A PROPER DATABASE

Substrates:

The substrate you use for the creation of your data set should be similar to the substrate you use most for production. Once a substrate has been selected, make sure you obtain enough to make the whole data set, as switching substrates can introduce error.

Typically, two to three calibration sets are required for each of your ink systems. Once for coated paper, another for uncoated paper, and yet another for film, if required. The best choice would be bright white paper stock. Good paper stock, specifically designed for calibrations, can be purchased from suppliers. (Refer to the Equipment Suppliers sub-section of this appendix.) Colored papers, such as kraft, can usually be accommodated at the time of formulation without a specific calibration set. If you only formulate on a stock such as kraft or foil, you can get a slight improvement in initial match accuracy by creating an additional calibration set for that substrate.

If you use mylar film or foil, it should thick enough to allow ease of use. Thin films can be difficult to print on due to wrinkling.

If mylar substrate is used, the mylar should be tested for its dyne level. Test kits are available for this purpose. (Refer to the Equipment Suppliers sub-section of this appendix.)

Inks:

Select single lots of all the inks that will be present in the data set. Make sure you have enough in the case that it becomes necessary to remake any part of the data set. Store these samples and do not use them for any other type of sampling or lab work.

When entering your inks into the data set, you will need to tell the software the composition of that ink (concentrate, extender, solvent). By properly entering this information, you will then be able to track the amount of Concentrate, Heavy Ink (concentrate + extender), and Light Ink (heavy ink + solvent) you use. Remember, Light Ink is “press ready” ink. Ink-Master expects all formulas in terms of Light Ink.

If you use a U.V. coating in your production, then you should also use it on all of your samples. A good data set will mimic your production process.

Sample Size:
The sample weight should be large enough as to improve accuracy by reducing the effect of weighing errors. As a low limit, use 1000 times the minimum readable amount of your balance. Therefore the minimum batch size for a balance with .01g readability is 10 grams.

WHAT LAB EQUIPMENT DO I NEED TO CREATE AN INK DATA SET?

Balance:
Used for precise weighing of your ink samples. It should be electronic and accurate to two decimal places for accuracy in weighing.

Mixing:
As with all processes, you want to duplicate the mixing process that is used in you production. If mixing is done manually, the same person should be used for all samples within a data set.

Proofing:
A reliable proofer must be used to insure the uniformity of samples. Manually operated devices can lead to variation between samples. A good proofer can repeatedly apply an even ink film through constant pressure and print speed.

Ink Pipette:
A volumetric measurement of the ink used to create a proof. A variation in the amount of ink used will obviously change the thickness of the ink film.

Viscosity Cup:
Used to measure the viscosity (how fluid it is) of your Light Ink (press ready). Any variance in viscosity will result in a variance of ink film thickness and effect color.

Refer to the Equipment Suppliers sub-section of this appendix for a list of suppliers.

HOW DO I CHOOSE WHICH TYPE OF DATABASE TYPE TO USE?

Your Ink-Master software can formulate using two different methods, Single Constant and Multi-Flux. A Multi-Flux data set is used if you add opaque white or you have high scattering inks. A Single Constant data set is used for transparent inks.

SPECIAL CONSIDERATIONS FOR A MULTI-FLUX DATA SET

A Multi-Flux data set is used for scattering inks and inks to which opaque white may be added. To properly characterize these inks, it is necessary that the inks be measured over white and over black. Various substrates can be obtained with the black stripe included. Suppliers of these substrates can be found in the Equipment Suppliers sub-section of this appendix.

Kraft paper should not be used to create a Multi-Flux data set. Instead, you should use an uncoated white substrate, and then measure the kraft as the substrate for your match.

WHAT CONCENTRATION LEVELS SHOULD I USE TO CREATE MY DATA SET?

When creating a data set, the software needs to “see” your inks at various concentration levels. We recommended you create six different concentration levels for each ink. Our recommended ink concentration levels are listed for you in the Recommended Ink Concentration Levels sub-section.

WHAT OTHER SAMPLES DO I NEED TO CREATE?

You will also need to make cross-mixes. A cross-mix is a sample that contains 3-5 different inks at known percentages. These samples are used to test the accuracy of your data set. A properly prepared data set will be able to correctly predict the known formula of these cross-mix samples. See the Recommended Ink Concentration Levels sub-section for some examples of cross-mixes.

CREATING YOUR SAMPLES

To begin creating your samples, you will need to have all necessary equipment ready, a supply of substrate, and your inks. After selecting the proper concentration levels and selecting the sample size, you can begin weighing your samples. You should be very careful in recording the actual weights of your samples. The software will accept any value, but that value must be accurate. For example, if you are creating a 10% ink level, but you overshoot and weigh 10.08%, you can use this level, just enter 10.08% into the software.

Next, use your standard procedure for mixing, measuring, and proofing your ink, making sure that you use the exact same procedure for every letdown.

The first sample you should make should be the lowest level of your black. This sample should be created twice, repeating the entire process exactly. These samples should then be measured and compared to one another. The purpose of this is to check the repeatability of your process. The larger the difference between these two samples, the more variance exists in your process. You may need to refine your process to minimize this variance.

It is important that you operate in an environment controlled as much as possible. Any changes in temperature or humidity will effect both your inks and substrates. You should also ensure that you keep your ink mixtures covered, as any evaporation of solvent will change the overall make-up of your sample.

Your first data set should be small (3-5 inks) so that it can be evaluated when you attend a formulation class. This will minimize the number of samples that need to be remade, should there be any necessary changes.

X-RITE INK FORMULATION CLASS

The X-Rite class you attend will teach you the proper use of the instrument and software that you have purchased. During this training you will receive instruction on how to make the most of your powerful new tools.

To maximize this learning experience we ask that you do some preparation and bring the following materials:

- A data set of 3-5 inks
- Cross-mixes that use the inks in your data set

EQUIPMENT SUPPLIERS

Substrates

The Leneta Company
15 Whitney Road
Mahwah, NJ 07430
(201) 847-9300

Proofers

IGT Reprotest
1450 E American Lane
Suite 1400
Schaumburg, IL 60173-4973
(847) 330-6322

Viscosity Cups

Norcross Corporation
255 Newtonville Ave.
Newton, MA 02158-1898
(617) 969-7020

Dyne Level Testing—for Mylar

Sherman Supplies (612) 430-9504

Misc. Lab Equipment—Balances, Etc.

VWR Scientific (800) 932-5000

Cole Parmer (800) 323-4340

Paul N. Gardner Company, Inc.
Gardner Building
316 N.E. First Street
Pompano Beach, FL 33060
(954) 946-9454

RECOMMENDED INK CONCENTRATION LEVELS

- 100.00% Ink
- 50.00% Ink
- 25.00% Ink
- 12.50% Ink
- 6.25% Ink
- 3.13% Ink

Cross-Mix Example

Below is an example of a 5 ink data set and the cross-mixes that would be necessary to test the data set.

	Ink	Mix Percent
Cross-Mix #1	Yellow	70%
	Red	25%
	Green	5%
Cross-Mix #2	Orange	70%
	Red	5%
	Blue	25%
Cross-Mix #3	Orange	5%
	Blue	70%
	Green	25%
Cross-Mix #4	Red	70%
	Blue	5%
	Yellow	25%
Cross-Mix #5	Yellow	5%
	Green	70%
	Orange	25%

APPENDIX B

Technical Support

B

X-Rite's commitment to quality does not end with your product purchase. We stand behind your system with a strong commitment to customer service. Our technical service departments are fully staffed with qualified technicians to assist you via phone or fax. When placing a call, please have the following information close at hand:

- Your software serial number
- Your name and company name
- Your telephone number
- If the problem you are experiencing caused an error message, write the message down
- Also, write down the steps you were performing before the problem occurred
- Have the hardware and/or software running within reach of the telephone

For Service Assistance
Telephone: 1-888-826-3042
Fax: 1-888-826-3043—include the above listed information in your fax

For Software Assistance via Phone
Telephone: 1-888-826-3046

For Software Assistance via E-Mail
Address: techservice@x-rite.com— include the above listed information with "Re: Ink-Master Software" at the beginning of your message

For Software Assistance via World Wide Web

1. Open the main page of the X-Rite Web Site, **www.x-rite.com**, and click on **Contacting X-Rite**.
2. Click on **Product Questions**.
3. Fill out the "form" provided on that page. Be sure to include "Re: Ink-Master Software" at the beginning of your product question.
4. Click on **Submit**.

APPENDIX C

Technical Glossary

A

Absolute White: A solid white with known spectral data that is used as the "reference white" for all measurements of absolute reflectance.

When calibrating a spectrophotometer, a white ceramic plaque is measured and used as the absolute white reference.

Absorb/Absorption: Dissipation of the energy of electromagnetic waves into other forms as a result of its interaction with matter; a decrease in directional transmittance of incident radiation, resulting in a modification or conversion of the absorbed energy.

Achromatic Color: A neutral color—white, gray, or black—that has no hue.

Additive Primaries: Red, green, and blue light.

When all three additive primaries are combined at 100% intensity, white light is produced. When these three are combined at varying intensities, a gamut of different colors is produced. Combining two primaries at 100% produces a subtractive primary, either cyan, magenta, or yellow:

100% red + 100% green = yellow
100% red + 100% blue = magenta
100% green + 100% blue = cyan

See *Subtractive Primaries*

Appearance: Manifestation of the nature of objects and materials through visual attributes such as size, shape, color, texture, glossiness, transparency, opacity, etc.

Attribute: Distinguishing characteristic of a sensation, perception or mode of appearance. Colors are often described by their *attributes* of hue, saturation or chroma, and lightness.

Analogous Colors: Colors that are close to each other on the color wheel and are also harmonious—for example, blues and purples are *analogous*.

Apparent Dot Area: The percentage of dot coverage in a specific area, as measured using a densitometer and calculated using the Murray-Davies equation:

$$\text{Apparent Dot Area} = \frac{1-10^{-(D_t)}}{1-10^{-(D_s)}} \times 100$$

Where: D_t = Density of tint minus density of paper

D_s = Density of solid minus density of paper

Apparent Dot Gain: The difference between the Apparent Dot Area of the film, as measured by a transmission densitometer, and the Apparent Dot Area of the proof or printed sheet, as measured with a reflection densitometer. Indicates how much the dots of ink have spread in the paper in relation to the original film dot area.

Apparent Trap Equation (Preucil Equation):

$$\%\ \text{apparent trap} = \frac{D_{OP} - D_1}{D_2} \times 100$$

Where: D_{OP} = Density of 2-color overprint
D_1 = Density of first ink down
D_2 = Density of second ink down

B

Black: The absence of all reflected light; the color that is produced when an object absorbs all wavelengths from the light source.

When 100% cyan, magenta, and yellow colorants are combined, the resulting color—theoretically—is black. In real-world applications, this combination produces a muddy gray or brown. In four-color process printing, black is one of the process inks.

The letter “K” is used to represent Black in the CMYK acronym to avoid confusion with Blue’s “B” in RGB.

Brightness: The attribute of visual perception in accordance with which an area appears to emit or reflect more or less light (this attribute of color is used in the color model HSB—Hue, Saturation, Brightness).

See *Lightness*

C

Chroma: The attribute of visual perception in accordance with which an area appears saturated with a particular color or hue—for example, a red apple is high in chroma; pastel colors are low in chroma; black, white, and gray have no chroma.

Chromatic: Perceived as having a hue; not white, gray or black.

Chromatic Attributes: Those attributes associated with the spectral distribution of light: *hue* and *saturation*.

Chromaticity, Chromaticity Coordinates: Dimensions of a color stimulus expressed in terms of hue and saturation, or redness-greenness and yellowness-blueness, excluding the luminous intensity. Generally expressed as a point in a plane of constant luminance.

See *CIE xy Chromaticity Diagram*.

CIE (Commission Internationale de l’Eclairage): A French name that translates to International Commission on Illumination, the main international organization concerned with color and color measurement.

CIELAB (or CIE L*a*b*, CIE Lab): Color space in which values L*, a*, and b* are plotted at right angles to one another to form a three-dimensional coordinate system. Equal distances in the space approximately represent equal color differences. Value L* represents Lightness; value a* represents the Redness/Greenness axis; and value b* represents the yellowness/blueness axis. CIELAB is a popular color space for use in measuring *reflective* and *transmissive* objects.

L*, a*, and b* are defined by the following equation:

$$L^* = 116\left(\frac{Y}{Y_n}\right)^{1/3} - 16$$

$$a^* = 500\left[\left(\frac{X}{Xn}\right)^{1/3} - \left(\frac{Y}{Yn}\right)^{1/3}\right]$$

$$b^* = 200\left[\left(\frac{Y}{Yn}\right)^{1/3} - \left(\frac{Z}{Zn}\right)^{1/3}\right]$$

where:
X, Y, Z are tristimulus values XYZ of the object;
X_n, Y_n, Z_n are tristimulus values for a *perfect reflecting diffuser*.

See *DE^*_{ab} Color Difference Equation*

CIELUV (or CIE L*u*v*, CIE Luv): Color space in which values L*, u*, and v* are plotted at right angles to one another to form a three-dimensional coordinate system. Equal distances in the space approximately represent equal color differences. Value L* represents Lightness; value u* represents the Redness/Greenness axis; and value v* represents the yellowness/blueness axis. CIELUV is a popular color space for use in measuring *emissive* objects.

$$L^* = 116\left(\frac{Y}{Y_0}\right)^{1/3} - 16 \text{ when } \frac{Y}{Y_0} > 0.008856$$

$$u^* = 13L^*(u' - u'_0)$$

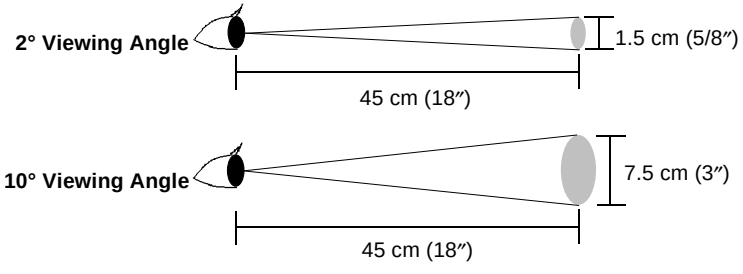
$$v^* = 13L^*(v' - v'_0)$$

where
Y: Tristimulus value Y
u', v': Chromaticity coordinates from the CIE 1976 UCS diagram.
Y_0, u'_0, v'_0: Tristimulus value and chromaticity coordinates u', v' of the perfect reflecting diffuser.

See *CIE UCS (Uniform Color Space) Diagram*, See *DE^*_{uv} Color Difference Equation*, *Perfect Reflecting Diffuser*.

CIE Standard Illuminants: Known spectral data established by the CIE for four different types of light sources. When using tristimulus data to describe a color, the illuminant must also be defined. These standard illuminants are used in place of actual measurements of the light source.

CIE Standard Observer: A hypothetical observer having the tristimulus color-mixture data recommended in 1931 by the CIE for a 2° viewing angle. A supplementary observer for a larger angle of 10° was adopted in 1964. If not specified, the 2° Standard Observer should be assumed. If the field of view is larger than 4°, the 10° Standard Observer should be used.

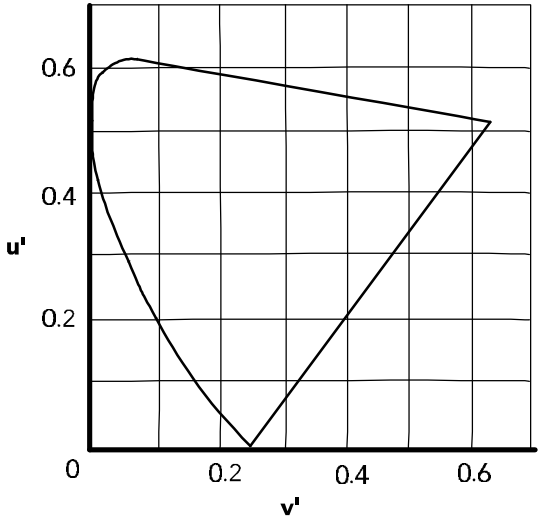


CIE UCS (Uniform Color Space) Diagram: The CIE Uniform Color Space Diagram was defined in 1976 and was intended to provide a more perceptually uniform color spacing model than the CIE xy Chromaticity Diagram. The u' and v' values can be calculated from the tristimulus values XYZ or from the chromaticity coordinates xy according the following formulae:

$$u' = \frac{4X}{X + 15Y + 3Z} = \frac{4x}{-2x + 12y + 3}$$

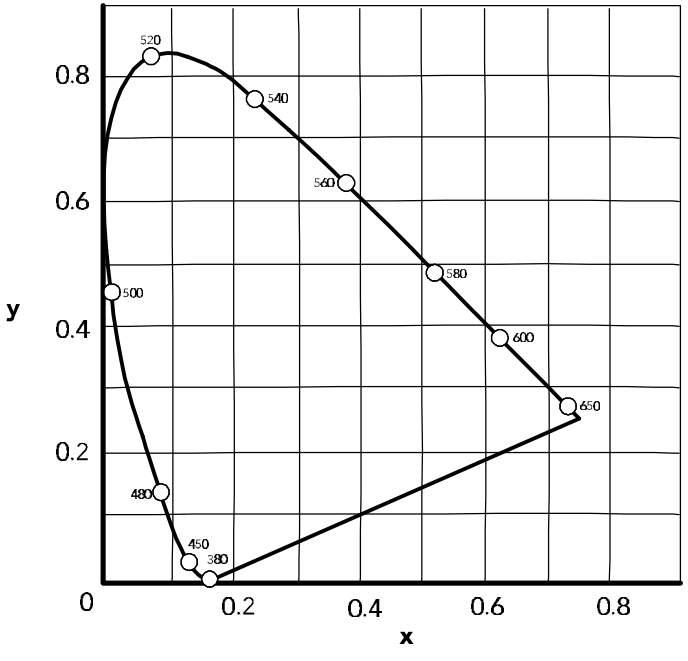
$$v' = \frac{9Y}{X + 15Y + 3Z} = \frac{9y}{-2 + 12y + 3}$$

where
X, Y, Z: Tristimulus values;
x,y: Chromaticity coordinates.



See *DE*$_{uv}$ Color Difference Equation*.

CIE xy Chromaticity Diagram: A two-dimensional graph of the chromaticity coordinates, x as the abscissa and y as the ordinate, which shows the *spectrum locus* (chromaticity coordinates of mono-chromatic light, 380-770nm). It has many useful properties for comparing colors of both luminous and nonluminous materials.



See *DE*$^*_{ab}$ *Color Difference Equation*.

CIE Tristimulus Values: Amounts (in percentages) of the three components necessary in a three-color additive mixture required for matching a color: in the CIE System, they are designated as X, Y, and Z. The illuminant and standard observer color matching functions used must be designated; if they are not, the assumption is made that the values are for the 1931 CIE 2° Standard Observer and Illuminant C.

CIE XYZ Tristimulus Values: Tristimulus values formulated based on the color-matching functions—$\bar{x}(\lambda)$ $\bar{y}(\lambda)$ $\bar{z}(\lambda)$—that were defined in 1931 by the CIE. Defined for measurement of reflective objects using the following formulae:

$$X = K \int_{380}^{780} S(\lambda)\bar{x}(\lambda)R(\lambda)d\lambda$$

$$Y = K \int_{380}^{780} S(\lambda)\bar{y}(\lambda)R(\lambda)d\lambda$$

$$Z = K \int_{380}^{780} S(\lambda)\bar{z}(\lambda)R(\lambda)d\lambda$$

$$K = \frac{100}{\int_{380}^{780} S(\lambda)\bar{y}(\lambda)d\lambda}$$

where

$S(\lambda)$: Relative spectral power distribution of the illuminant;

$\bar{x}(\lambda)$ $\bar{y}(\lambda)$ $\bar{z}(\lambda)$: Color-matching functions for the CIE 2° Standard Observer;

$R(\lambda)$: Spectral reflectance of object.

CIE xyz Chromaticity Coordinates: Plotted to for the xyY chromaticity diagram which visually represents the gamut of vision for the 1931 CIE 2° Standard Observer. Calculated from the CIE XYZ Tristimulus Values according to the following formulae:

$$x = \frac{X}{X+Y+Z}$$

$$y = \frac{Y}{X+Y+Z}$$

$$z = \frac{Z}{X+Y+Z} = 1-x-y$$

CMC (Color Measurement Committee): Of the Society of Dyes and Colourists in Great Britain. Developed a more logical, ellipse-based equation for computing ΔE values as an alternative to the rectangular coordinates of the CIELAB color space.

CMC Color Difference Equation:

$$\Delta E_{cmc} = [(\Delta L^*/lS_L)^2+(\Delta C^*_{ab}/cS_C)^2+(\Delta H^*_{ab}/S_H)^2]^{1/2}$$

where $l = 2$, $c = 1$, * and

$$\Delta C^*_{ab} = (a^{*2}+b^{*2})^{1/2}$$

$$\Delta H^*_{ab} =[(\Delta a^*)^2 + (\Delta b^*)^2 - (\Delta C^*_{ab})^2]^{1/2}$$

ΔL^*, Δa^*, and Δb^* are the differences between the sample and the target color in the L^*, a^*, and b^* values.

$$S_L = \frac{0.040975L^*}{1+0.01765L^*} \text{ unless } L^* < 16, \text{ then SL} = 0.511;$$

$$S_C = \frac{0.0638\Delta C^*_{ab}}{1+0.131\Delta C^*_{ab}} + 0.638$$

$$S_H = S_C\ (FT + 1 - F)$$

and where

$$F = \left[\frac{(\Delta C^*_{ab})^4}{(\Delta C^*_{ab})^4 + 1900}\right]^{1/2} \text{ and}$$

$$T = 0.36 + |0.4\cos(h_{ab} + 35)|; \text{ unless } 164° \leq h_{ab} \leq 345°, \text{ then}$$
$$T = 0.56 + |0.2\cos(h_{ab} + 168|$$

CMY: The subtractive primaries cyan, magenta, and yellow.

See *Subtractive Primaries*

Color Bar (or Production Control Bar): A series of ink patches printed on a press sheet that includes solids of cyan, magenta, yellow, black, and spot color ink; 25%, 50%, and 75% tints of those colors; and two-color overprints using those colors.

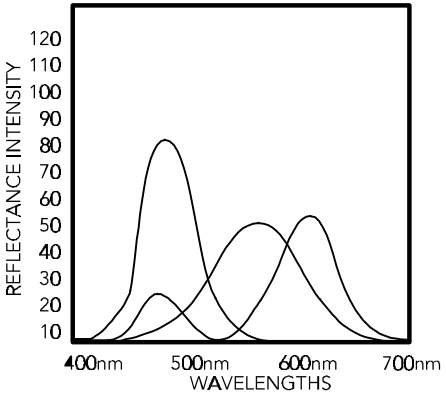
Press operators measure these patches determine the density values of the solids; dot gain values in the tints; and trap percentages of the overprints. Some color bars also include special patches to check for other effects, such as slur and doubling.

Color Correction: A photographic or electronic process that is used to compensate for the deficiencies of process inks and also the deficiencies of the color separation process. A color correction can also refer to any color change requested by the client.

Color Difference: The magnitude and character of the difference between two object colors under specified conditions.

Color Matching Functions: Relative amounts of three additive primaries required to match each wavelength of light. The term is generally used to refer to the CIE Standard Observer color matching functions designated $\bar{x}(l)+\bar{y}(l)+\bar{z}(l)$.

See *CIE Standard Observer*.



$\bar{x}(l)$

$\bar{y}(l)$

$\bar{z}(l)$

Color Model: A color measurement scale or system that numerically specifies the perceived attributes of color. Used in computer graphics applications and by color measurement instruments.

Color Separation: The conversion of the red, green, and blue color information used in a computer into cyan, magenta, yellow, and black channels that are used to make printing plates.

Color Sequence: See *Sequence*.

Color Space: A three-dimensional geometric representation of the colors that can be seen and/or generated using a certain color model.

Color Specification: Tristimulus values, chromaticity coordinates and luminance value, or other color-scale values, used to designate a color numerically in a specified color system.

Color Temperature: A measurement of the color of light radiated by an object while it is being heated. This measurement is express in terms of absolute scale, or degrees Kelvin. Lower Kelvin temperatures such as 2400°K are red; higher temperatures such as 9300°K are blue. Neutral temperature is gray, at 6504°K.

Color Wheel: The visible spectrum's continuum of colors arranged into a circle, where complementary colors such as red and green are located directly across from each other.

Colorants: Materials used to create colors—dyes, pigments, toners, waxes, phosphors.

Colorimeter: An optical measurement instrument that responds to color in a manner similar to the human eye—by filtering reflected light into its dominant regions of red, green, and blue.

Colorimetric: Of or relating to values giving the amounts of three colored lights or receptors—red, green, and blue.

Complements: Two colors that, when combined, create neutral gray. On a color wheel complements are directly opposite the axis from each other: blue/yellow, red/green, and so on.

Contrast: The level of variation between light and dark areas in an image.

Cyan: One of the process ink colors for printing. Pure cyan is the "redless" color; it absorbs all red wavelengths of light and reflects all blue and green wavelengths.

D

D_{50}: The CIE Standard Illuminant that represents a color temperature of 5000°K. This is the color temperature that is most widely used in graphic arts industry viewing booths.

D_{65}: The CIE Standard Illuminant that represents a color temperature of 6504°K. This is the color temperature that is most widely used in viewing booths outside of the graphic arts industry.

See *Kelvin (K)*.

Daylight Illuminants: See *Illuminants D*.

Delta (Δ): A symbol used to indicate deviation or difference.

Delta Error (ΔE): In color tolerancing, the symbol ΔE is often used to express Delta Error, the total color difference computed using a color difference equation.

The color difference is generally calculated as the square root of the combined squares of the chromaticity differences, Δa* and Δb*, and the Lightness difference, ΔL.

ΔE^*_{ab} Color Difference Equation:

$$\Delta E^*_{ab} = \left[(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2 \right]^{1/2}$$

ΔE^*_{uv} Color Difference Equation:

$$\Delta E^*_{ab} = \left[(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2 \right]^{1/2}$$

Densitometer: A sensitive, photoelectric instrument that measures the density of images or colors.

See *Reflection Densitometer* and *Transmission Densitometer*

Density: The ability of a material to absorb light—the darker it is, the higher the density. Calculated using the following formulae:

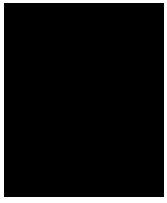
$$\text{Density} = \log_{10} 1/R$$

$$R = \sum_{l=390}^{700} \Pi(l) b(l) d\, l$$

where:

$b(l)$ = the sample's spectral reflectance intensity at wavelength l .

$\Pi(l)$ = densitometer response status (T, E, A, M, etc.).



See *Color Bar (Production Control Bar)*, *Reflection Densitometer*, and *Transmission Densitometer*

Device-Dependence: Describes a color space that can be defined only by using information on the color-rendering capabilities of a specific device. For example, the RGB color space must be generated by a monitor, a device which has specific capabilities and limitations for achieving its gamut of colors. In addition, all monitors have different capabilities and limitations, as do different scanners, printers, and printing presses.

Device-Independent: Describes a color space that can be defined using the full gamut of human vision, as defined by a standard observer, independent of the color-rendering capabilities of any specific device.

Dot Area: See *Apparent Dot Area*.

Dye: A soluble colorant; as opposed to pigment, which is insoluble.

Dynamic Range: An instruments range of measurable values, form the lowest amount it can detect to the highest amount it can handle.

E

Electromagnetic Spectrum: The massive band of electromagnetic waves that pass through the air in different sizes, as measured by wavelength. Different wavelengths have different properties, but most are invisible—and some completely undetectable—to human beings. Only wavelengths that are between 380 and 720 nanometers in size are visible, producing

light. Invisible waves outside the visible spectrum include gamma rays, x-rays, microwaves and radio waves.

Emissive Object: An object that emits light. Usually some sort of chemical reaction, such as the burning gasses of the sun or the heated filament of a light bulb.

F

Flair: The phenomenon where the color of an object changes in appearance under different illuminants. Also see *Metamerism*, which involves the relationship between two colors under different lighting.

Fluorescent Lamp: A glass tube filled with mercury gas and coated on its inner surface with phosphors. When the gas is charged with an electrical current, radiation is produced which in turn energizes the phosphors, causing the phosphors to glow.

Four-Color Process: Depositing combinations of the subtractive primaries cyan, magenta, yellow, and black on paper. These colorants are deposited as dots of different sizes, shapes, and angles to create the illusion of different colors.

See *Subtractive Primaries*

G

Gamut: The range of different colors that can be interpreted by a color model or generated by a specific device.

Gamut Mapping: Converting the coordinates of two or more color spaces into a common color space. Often results in tonal range compression.

See *Tonal Range Compression*

Gray Balance: The specific combination of cyan, magenta, and yellow that creates a neutral gray.

H-I

HiFi Color: Any system or technique that expands the color gamut of a printing press, either with more plates, better inks, or both. HiFi Color is intended to print products that are brighter and more colorful than regular four-color offset. The term HiFi Color™ was originally coined by Mills Davis, founder of the HiFi Color Project.

Hue: The basic color of an object, such as “red,” “green,” “purple,” etc. Defined by its angular position in a cylindrical color space, or on a Color Wheel.

Illuminate: Incident luminous energy specified by its spectral distribution.

Illuminant A (CIE): CIE Standard Illuminant for incandescent illumination, yellow-orange in color, with a correlated color temperature of 2856°K.

Illuminant C (CIE): CIE Standard Illuminant for tungsten illumination that simulates average daylight, bluish in color, with a correlated color temperature of 6774°K.

Illuminants D (CIE): CIE Standard Illuminants for daylight, based on actual spectral measurements of daylight. D_{65} with a correlated color temperature of 6504°K is most commonly used. Others include D_{50}, D_{55}, and D_{75}.

Intensity: Saturation or reflective energy as related to visible wavelengths of light. Reflectance of wavelengths at high intensity generates high saturation, or chroma.

K-L

Kelvin (K): Unit of measurement for color temperature. The Kelvin scale starts from absolute zero, which is -273° Celsius.

L*C*H°: A color space that is similar to CIELAB, except uses cylindrical coordinates instead of rectangular coordinates. The Lightness value L* is the same; Chroma C* and Hue angle H° are defined using the following formulae:

Metric Chroma: $C^* = \sqrt{(a^*)^2 + (b^*)^2}$

Metric Hue Angle: $h° = \tan^{-1}\left(\frac{b^*}{a^*}\right)[\text{degrees}]$

where
a*,b*: Chromaticity coordinates in the L*a*b* color space.

Light: Electromagnetic radiation in the spectral range detectable by the human eye (approx. 380 to 720nm).

Light Booth: See *Viewing Booth*.

Lightness: The attribute of visual perception in accordance with which an area appears to emit or reflect more or less light. Also refers to the perception by which white objects are distinguished from gray objects and light-from dark-colored objects.

Light Source: The element in an instrument or in the visual observing situation that furnishes the illuminating light.

Luminance: Term used by the CIE to describe color brightness. Represented by the Y coordinate in the CIE XYZ color space.

M

Magenta: One of the process ink colors for printing. Pure magenta is the "greenless" color; it absorbs all wavelengths of green from light and reflects all red and blue wavelengths.

Memory Colors: Familiar colors such as sky blue, grass green, and flesh tones. In the printing process, these are the most important colors to faithfully achieve. If any of these are perceived as even slightly incorrect, the rest of the image will likely seem incorrect, as well.

Metamerism, Metameric Pair: The phenomenon where two colors appear to match under on light source, yet do not match under a different light source. Two such colors are called a metameric pair.

Monitor RGB: Same as RGB; monitor RGB simply refers specifically to the color space that can be achieved by a particular monitor using combinations of red, green, and blue light.

N

Nanometer (nm): Unit of length equal to 10^{-9} meter, or one millionth of a millimeter. Wavelengths are measured in nanometers.

Neutral: A color that has no hue. Examples are white, gray, or black.

NTSC (National Television Standards Committee): Standards organization that provides the standard color model for television displays in the United States.

O-P

Overprint: On a press sheet color bar, overprints are color patches where two process inks have been printed, one atop the other. Checking the

density of these patches allows press operators determine trap value. The term Overprint also applies to any object printed on top of other colors.

Perfect Reflecting Diffuser: An object or substrate that is perfectly white, reflecting 100% of wavelengths of light that strike its surface.

Phosphor Dots: Minute particles of phosphor on a monitor screen. On a color monitor, the red, green, and blue phosphor dots are placed on the viewing screen in a pattern of dot triads—a phosphor dot of each color forming one-third of the triad.

Phosphors: Materials that emit light when irradiated by cathode rays, or when placed in an electric field. The quantity of visible light is proportional to the amount of excitation energy present.

Photoelectric: Pertaining to the electrical effects of light or other radiation—for example, emission of electrons.

Photoreceptor: The cone - and rod -shaped neurons that cover the retina of the eye. Photoreceptors are excited by visible wavelengths, then send signals to the brain where the sensation of color is perceived.

The cone-shaped photoreceptors are sensitive to one of three major regions of the visible spectrum: some are sensitive to red light, some to green light, and some to blue. The rod-shaped photoreceptors are sensitive to black and white.

Pigment: An insoluble colorant; as opposed to a *dye*, which is soluble.

Pixel: A tiny picture element that contains red, green, and blue information for color rendering on a monitor or a scanner. When generating colors, pixels are similar to dots of ink on paper. A monitor resolution description in terms of pixels-per-inch (ppi) is similar to a printer resolution description in terms of dots per inch (dpi).

Preucil Equation: See *Apparent Trap Equation (Preucil Equation)*.

Primary Colors: The dominant regions of the visible spectrum: red, green, and blue; and their opposite colors cyan, magenta, and yellow.

See *Additive Primaries*, *Subtractive Primaries*

Prism: Triangular-shaped glass or other transparent material. When light is passed through a prism, its wavelengths refract into a rainbow of colors.

This demonstrates that light is composed of color, and indicates the arrangement of colors in the visible spectrum.

See *Visible Spectrum*

Process Colors: See *Four-Color Process*.

R

Reflective Object: A solid object that returns some or all of the wavelengths of emitted light that strike its surface. A reflective object that returns 100% of all light it is called a *perfect diffuser*—a perfectly white surface.

Reflectance: The percentage of light that is reflected from an object. Spectrophotometers measure an object's reflectance at various intervals along the visible spectrum to determine the object color's spectral curve.

See *Spectral Curve, Spectral Data*

Reflection Densitometer: An instrument that measures the amount of incident light that is reflected from the surface of a substrate, such as ink on paper.

Retina: A light-sensitive membrane lining the inner rear of the eyeball and connected to the brain by the optic nerve.

RGB: The additive primaries red, green, and blue.

See *Additive Primaries*

S

Saturation: The attribute of color perception that expresses the amount of departure from the neutral gray of the same lightness. Also referred to as *chroma*.

Sequence: The order in which inks are deposited on paper by a printing press.

Spectral Curve: A color's "fingerprint"—a visual representation of a color's spectral data. A spectral curve is plotted on a grid comprised of a vertical axis—the level of reflectance intensity; and a horizontal axis—the visible spectrum of wavelengths. The percentage of reflected light is plotted at each interval, resulting in points that form a curve.

Spectral Data: The most precise description of the color of an object. An object's color appearance results from light being changed by an object and reflected to a viewer. Spectral data is a description of how the reflected light was changed. The percentage of reflected light is measured at several intervals across its spectrum of wavelengths. This information can be visually represented as a *spectral curve*.

Spectrophotometer: An instrument that measures the characteristics of light reflected from an object, which is interpreted as *spectral data*.

Spectrum: Spatial arrangement of electromagnetic energy in order of wavelength size.

See *Electromagnetic Spectrum*, *Visible Spectrum*

Standard: An established, approved reference against which instrument measurements of samples are evaluated.

Standard Illuminants: See *CIE Standard Illuminants*.

Standard Observer: See *CIE Standard Observer*.

Status: Term used for spectral response of reflection densitometers. Standard Status responses include:

- **Status A** represents ANSI Status A, which is used in photo finishing applications.
- **Status E** represents a European response which uses a 47B filter for yellow.
- **Status I** represents a narrow band response.
- **Status T** represents ANSI Status T.
- **Spectral X** represents a spectral based band pass filter.

Subtractive Primaries: Cyan, Magenta, and Yellow. When all three subtractive primaries are combined at 100% on white paper, black is produced. When these three are combined at varying intensities, a gamut of different colors is produced. Combining two primaries at 100% produces an additive primary, either red, green, or blue:

100% cyan + 100% magenta = blue
100% cyan + 100% yellow = green
100% magenta + 100% yellow = red

See *Subtractive Primaries*

T

Tint: On a press sheet color bar, a patch of halftone dots that represents a percentage of the solid ink, such as a 25%, 50%, or 75% tint. Tints on the film are measured to determine apparent dot area, and tints on paper are measured and compared to the film to determine apparent dot gain.

See *Apparent Dot Area*, *Apparent Dot Gain*

Tolerance: The amount of acceptable difference between a known correct standard and a set of measured samples. Color measurements are evaluated using the ΔE tolerancing method.

See *DE Error*

Tonal Range Compression: The color space coordinates of a color space with a larger gamut are reduced to accommodate the smaller gamut of a destination color space. For example, the gamut of photographic film is compressed for representation in the smaller CMYK gamut used for four-color process printing.

See *Gamut*

Transmission Densitometer: An instrument that measures the amount of light that is transmitted through film from a light source.

Transmissive Object: An object that allows light to pass through from one side to the other. The color of a transmissive object results from the manipulation of wavelengths of light as they pass through.

Trap: An indication of the ability of a printed ink to accept the next ink printed, in comparison with the paper's ability to accept the second ink down.

See *Apparent Trap Equation (Preucil Equation)*

Tristimulus: A method for communicating or generating a color using three stimuli—either additive or subtractive colorants (such as RGB or CMY), or three attributes (such as lightness, chroma, and hue).

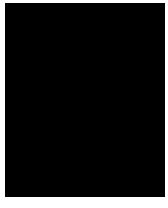
Tristimulus Data: The three tristimulus values that combine to define or generate a specific color, such as R 255/G 255/B 0. Tristimulus data does not completely describe a color—the illuminant must also be defined. Also,

in device-dependent color models such as RGB, the capabilities of the viewer or color-rendering device must also be defined.

V

Value: Another term for *Chroma* or *Saturation*.

Viewing Booth: A enclosed area with controlled lighting that is used in graphic arts studios, service bureaus, and printing companies as a stable environment for evaluating proofs and press sheets. Viewing booths for the graphic arts industry are generally illuminated using D_{50} lighting (otherwise D_{65} lighting), and are surfaced in neutral gray colors.



See *D_{50} and D_{65}*

Visible Spectrum: The region of the electromagnetic spectrum between 380 and 720 nanometers. Wavelengths inside this span create the sensation of color when they are viewed by the human eye. The shorter wavelengths create the sensation of violets, purples, and blues; the longer wavelengths create the sensation of oranges and reds.

Colors of the visible spectrum blend seamlessly between major regions of color, which are arranged in the following order:

Ultra-Violet—Violet—Indigo—Blue—Green—Yellow—Orange—Red—Infra-Red
(Invisible) (Invisible)

W-X-Y

Wave: A physical activity that rises and then falls periodically as it travels through a medium.

Wavelength: Light is made up of electromagnetic waves; wavelength is the crest (peak)-to-crest distance between two adjacent waves. Represented in equations by the Greek symbol Lambda (λ).

White Light: Theoretically, light that emits all wavelengths of the visible spectrum at uniform intensity. In reality, most light sources cannot achieve such perfection.

XYZ Color Model: See *CIE XYZ Color Model*.

xyY Chromaticity Diagram: See *CIE Chromaticity Diagram*.

Yellow: One of the process ink colors for printing. Pure yellow is the "blueless" color; it absorbs all wavelengths of blue from light and reflects all red and green wavelengths.

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